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THE PROPER SCOPE OF SCIENTIFIC (SO-CALLED EXPERT) TESTIMONY IN TRIALS INVOLVING PHARMACOLOGIC QUESTIONS.[1]

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It is by request of your committee of invitation that I shall devote the address I have the honor to make to you to-day to the consideration of the subject of "expert testimony" in certain of its relations having a common interest for physicians and pharmacists. My criticisms will be addressed principally to our own faults, not to those of others. Doubtless there are many motes in the eyes of the lawyers; but before we discuss the best method of extracting these motes, let us try to discover how we can get rid of the beams that tend to make our own vision oblique.

It is not to be denied that the "medical expert" or "chemical expert" witness is often an object of suspicion to courts and juries; that lawyers out of court find no impropriety in ridiculing him, while in court, if he is on the other side, their attitude toward him is not invariably one of the highest respect for his knowledge or his devotion to the truth. Moreover, this unflattering estimate of the sincerity of the expert witness is not confined to courts and lawyers; it is reflected in the press and in the comments of the man in the street. It would be soothing to wounded vanity to attribute the distrust of expert testimony entirely to the obscurity of the difficult scientific questions so often involved and the inadequacy of the legal methods of the day for the development and presentation of such

[1] An address delivered before the Philadelphia College of Pharmacy, November 15, 1904.

questions. Undoubtedly these impersonal elements are important factors; but it must be admitted that there are also personal factors, and that for the latter, physicians and chemists are not without blame. When men of equal reputation and competence can be found, apparently in any desired number, to form either of two opposite opinions upon the same apparently simple set of facts; can be induced to express positive and conflicting views upon questions concerning which the evidence is insufficient for the formation of a positive view of any kind; and are willing, moreover, to suggest to an attorney questions that seem to have no other purpose than to confuse scientific colleagues who may appear as witnesses on the other side, or unfairly to impugn and belittle the evidence given by such colleagues—is the assumption wholly without plausibility that the nature of the testimony given by any expert witness is in effect determined by the necessities of that side of the case upon which he is employed? We know, and many attorneys know, that, despite its plausibility, the assumption is far from being correct. But that is because we and the attorneys know what the newspapers and the public do not know and cannot know; namely, how often physicians and chemists decline to testify in behalf of interests that have consulted them, because on examination of the facts they find that they cannot truthfully give the testimony desired. That incompetent, inaccurate, overzealous, or even untruthful persons sometimes appear in the rôle of expert witnesses, playing it very much to the satisfaction not only of their employers, but also of the jury and the spectators—may be admitted. With this phase of the subject, however, I do not purpose to deal at this time. I shall consider only the difficulties besetting competent men, desirous to tell the truth and nothing but the truth, when they go upon the witness stand to instruct courts and juries upon pharmacologic and toxicologic questions.

In the first place, it is often requisite to state technical facts in untechnical language. There is much difference between lack of technicality and simplicity. The simplest statement is always the best; but the untechnical statement is not always the simplest—frequently it is the most complex. Consider for a moment only the physical and chemical questions of osmosis, of atomic weight, of valency, of crystallization, of stereochemism, of ionization; or the pharmacologic questions of the effects of drugs upon metabolism or upon cell structure. How can such matters be expressed in other

than technical terms, and yet be expressed both clearly and adequately? The only way out of the difficulty is not to try to get out of it. Let us state our technical position for the record, as simply as possible; that is, in technical terms. We may then explain in untechnical language for the jury. One common result of the effort to avoid technical statements is a multiplication of words from which juries, even more intelligent than the average, can gather no clear idea. Another is an impossible simplification of a difficult problem, which is consequently, even though a correct conclusion be reached, open to just criticism—*a fortiori* to captious criticism. Just here comes to light one grave fault of medical and chemical experts. We are too prone to make and to suggest that very kind of captious criticism of the testimony of an opposing witness, not for the purpose of eliciting truth, but in order to score a point in the game. Such tactics may be perfectly proper on the part of an advocate, but not on the part of one who professes to be impartially devoted to science.

And this brings into view a second difficulty. Theoretically, the expert witness is an adviser of the court. He is called in, because of his supposedly superior knowledge, to help the judge and jury to understand the significance of certain facts testified to by himself or others, which cannot be understood without such assistance. He should have no interest in the bearing of these facts upon the verdict to be rendered. Was or was not arsenic present in a certain liver or stomach examined by him? Do or do not certain post-mortem appearances, or certain symptoms observed during life, indicate death from poisoning? Is or is not the continuous and unsuspected administration of unknown quantities of boric acid or salicylic acid or sodium sulphite injurious to health? These and like matters are the subjects upon which he is called to state judgments of fact or to express opinions, and in consequence to detail the observations and explain the reasoning upon which such judgments or opinions are based. But his interest in the matter should be entirely scientific. It should be no concern of his, as a witness, whether the presence or absence of arsenic in the tissues or other materials that he has examined, or the significance of the symptoms described, or the harmfulness or harmlessness of chemicals used as food preservatives, may lead to the conviction or acquittal of any individual or the gain or loss of any commercial interest. His function in court is quite clear. It is (*a*) to describe the methods and the results of his ex-

aminations; (*b*) to state the conclusions that his study and observation in general enable him to draw rom a given set of facts observed and described by him or testified to by others; (*c*) to enlighten the court as to matters of scientific knowledge relevant to the issues presented, but not dependent upon any testimony as to fact given in the special cause at trial. Beyond that his testimony, his advice, his interest, should not go.

Under present methods, however, the expert witness is not summoned in his theoretical capacity of impartial teacher and adviser. He is called apparently, and often in reality, as a partisan and an advocate. Indeed, whatever his own view may be as to his relation to the case, he is usually regarded and treated as a partisan and advocate by judge, jury, lawyers, spectators and newspapers. How often do we read in great headlines of the "Battle of the Experts!" How often is the speculation heard, privately or publicly, as to whether the prosecution or the defense will "get Dr. A.," with the implication that the other side will then necessarily "get Dr. B.," and that Drs. A. and B. will, of equal necessity, express in court opposite opinions on the same facts.

There is unquestionably a legitimate field of work for the scientific or "expert" advocate; but it is by the side of counsel, not on the witness stand. As witness, one is bound by his oath and by his duty to the court and to the State to endeavor to assist judge and jury to reach correct conclusions, without reference to the effect of those conclusions upon the verdict to be rendered. He is to distort nothing, magnify nothing, minimize nothing; assert as positive nothing doubtful, throw doubt upon nothing certain; introduce nothing irrelevant, suppress nothing material; give utterance to no statement of fact, advance no theory, that he would shrink from defending before a learned society. But as advocate, one may properly consider the bearing of testimony upon the verdict and endeavor to have judge and jury impressed with the especial importance of those facts and theories making for his side of the case, and with the doubtfulness and unimportance of those making for the opposing side. The functions of the witness and of the advocate should therefore never be united in the same person. Human nature being what it is, however, our present methods tend to imbue expert witnesses with somewhat of the advocate's spirit. Some do not realize this tendency; others, despite their effort to avoid

partisan advocacy, are badgered into it by the unfair efforts of cross-examiners to throw doubt and obscurity upon their direct testimony. Unfortunately these efforts are sometimes instigated and directed by the expert witnesses of the other side.

The remedy for this difficulty lies wholly in our own hands. It will not do to abuse the lawyers for it, however much they may abuse us when we are on the witness stand. Use, abuse or misuse what and whom they will, they cannot make use of us for any purpose for which we refuse to be made use of.

A third order of difficulties has been alluded to, but may now be considered more fully. It is often assumed that expert witnesses are not called to give testimony as to fact, but merely to express opinions, and that hence opinion may properly be set against opinion. This is but partially true. Expert witnesses are frequently called to express opinions upon facts which they must themselves first testify to, or to express judgments of fact, and not opinions at all—upon investigations that they have themselves made. This is especially the case with chemists and pathologists. We can here confine our attention to chemists.

A chemist or pharmacist may be asked, for example, to make certain analyses in order to determine the purity of pharmaceutical products, or to acertain whether foods or articles of commerce have been adulterated or have had foreign substances added to them to color, disguise, or preserve them; or to discover whether certain substances—sometimes human tissues—contain poison. He submits the suspected articles to certain physical and chemical manipulations; examines them with the naked eye, with the microscope, with the spectroscope, and otherwise. Upon the results of these examinations he forms a judgment. When describing in court the methods and results of his examinations, it will be generally admitted that he testifies as to facts. How about the judgment he has formed? That judgment, when stated in court, is commonly treated as an expression of opinion. In reality, it is a judgment as to fact, as valid as any other judgment as to fact that can be made the subject of testimony. It differs from ordinary judgments in that special skill and knowledge are required, first, to obtain its data, and, secondly, to understand their significance; but so do many other judgments that we never think of treating as matters of opinion—which are, indeed, recognized to be therefore more accurate—

not more dubious, than ordinary judgments; for example, that of a navigator as to the position of his ship, or of a surveyor as to the dimensions of a certain plot of ground, or of a skilled weigher as to the number of pounds contained in a heap of coal. The differences that may exist among these various judgments are not those of kind, but merely of degrees of complexity. Such judgments may be mistaken; but that, while it subjects them to correction, does not remove them to the category of opinions—unless the term opinion be extended to include every mental operation in the nature of a judgment.

Testimony concerning chemical analysis and its results is properly to be subjected to criticism as to the pertinency, correctness, skill, and accuracy of the manipulations and as to their conclusiveness; but such criticism deals with fact, and must be kept within due bounds. It is perfectly proper to point out, for example, that in the attempted identification of poisons, a careless observer may mistake antimony for arsenic; but it is misleading—and a competent chemist must consider it deliberately so—to attempt to make a jury believe that discrimination between arsenic and antimony is at all uncertain when the right tests have been made with due care and intelligence. It is not in any degree a matter of opinion subject to debate and dispute, but an acknowledged fact of science. No expert should lend himself to a pettifogging practice of the nature described.

Again, it is proper to point out and inquire about all sources of error in manipulation; but undue insistence upon widespread contamination of vessels and reagents with, for example, arsenic, can be considered only captious criticism in the presence of statements that due care has been taken by blank tests and otherwise to exclude that source of error and when amounts have been found not to be accounted for even approximately by these common contaminations. I have elsewhere suggested that important examinations by official analysts should be made in the presence of experts representing the other side; or that both sides should, in cases in which this method is possible, be permitted to have analyses made by their respective experts. The further suggestion was also made that analysts should be required to be preserve the results of final and decisive tests for exhibition and criticism in court. Such procedures would go far, I think, to avert the sort of criticism here deprecated and also to guard against incompetence, carelessness or error, in official or partisan analysis.

Opinions may, in certain cases of chemical analysis, differ as to the scope and conclusiveness of special tests. In all such cases it is a simple matter for the expert witnesses on both sides to state the issue, first in technical terms for the record, secondly in non-technical terms for the enlightenment of court and jury, and in such a way as to make clear the exact point in dispute and its bearing on the final judgment of fact. It is also easy to take the opposite course with intent to becloud the issue. Were the straightforward, scientific, impartial way obligatory in every instance, many issues which have been allowed to occupy much of the time and attention of courts and juries would at once be shown to be based on trivialities of no possible importance in the cause at trial.

Still another source of confusion between fact and opinion arises from the questioning of expert witnesses as to what may be termed facts of science, and the failure of courts to rule uniformly as to just what testimony of this kind is admissible. One court will permit the widest and wildest latitude; another will exclude as "hearsay" all matters outside the personal experience of the expert witness. I do not purpose to discuss these conflicting rulings from a legal viewpoint. Shall doctors decide when judges disagree? But I may be permitted to point out the logical and scientific difficulties involved in both positions.

First let us consider the position of an expert witness called upon to differentiate between the knowledge he has obtained from reading and that which he has acquired by personal observation. How far a chemist or pharmacist may be able to do this, I do not know. If you have all verified by balance-tests and other appropriate methods the atomic weights, the valencies, the electric positions, and other properties of all the elements, and the structures of all the compounds, perhaps you may begin to think of qualifying under the "no hearsay" rule. I doubt, however, whether any physician could state accurately how much of the composite pictures he carries in his mind of the symptomatology and pathology of diseases and of the effects of drugs—even of a disease so common as typhoid fever or of a drug so much used as opium or mercury—is based upon cases personally observed, to the exclusion of those read about. One of the best known pathologists in America, a man of enormous experience, told me that he had never personally made a post-mortem examination of a case of combined sclerosis of the

spinal cord, although of course he had seen and studied sections of cords from such cases. Some physicians have never seen a case of infantile scurvy; but they know that the affection exists and that it gives rise to discolorations of the skin that are often mistaken for bruises, and upon which unfounded charges of cruelty to children may be brought. I have never examined a thyroid gland for iodin or arsenic, yet I know that iodin is constantly and arsenic sometimes found in thyroid glands of men and animals, apparently in each case as a normal constituent. If the question of the possible presence of iodin or arsenic in normal thyroid glands should be of importance in a given trial, could I not properly state my knowledge as book knowledge? Must one send for Mendel or Gautier to testify to personal analysis? I have never seen an insane person commit homicide or suicide, yet I have testified in court that certain persons ought to be kept under restraint lest they should kill themselves or others, and I believe that the testimony was properly given and properly accepted. Would not the "no hearsay" rule exclude this testimony also? Even had I seen the dead bodies of insane suicides or of the victims of homicidal maniacs, that fact would not seem to remove my knowledge from the hearsay category; nothing would do that except actually seeing the killing. I know that arsenic poisoning has been caused by contaminated beer, by wall paper, by stockings; though I have never analyzed beer, wall paper or stockings for the presence of arsenic. I know that in this city fatal lead poisoning has been caused by cakes colored with chrome yellow, though I did not see any of the cakes. I have not even seen the men at work painting or making lead, whom I have treated for lead poisoning acquired in such occupations.

That iodin is a constant normal constituent of the thyroid gland, and that Gautier, Bertrand, and others have found arsenic in the normal thyroid gland and other normal tissues; that maniacs have committed homicide and suicide; that arsenic poisoning has been caused by contaminated beer—are facts, not opinions. They are facts known only or best to certain persons, because those persons have made special studies involving the knowledge of such facts; and whatever the law may be, it would appear reasonable that when facts of this order are relevant to the issue, qualified persons should be permitted to testify concerning them as part of the sum total of the knowledge acquired by reading and observation. On the other

hand; when a fact of this nature is uncommon it is perfectly proper to bring out its rarity; and, if such be the case, to show that while an integral portion of the witness's knowledge, it is, nevertheless outside of his personal observation.

So much for the one position. Now for the other. To confine ourselves to a chemical illustration, which may have toxicologic bearing, let us take Gautier's observation of the presence of arsenic in the normal human body. If this bare statement should be permitted to be made in court in a case in which the presence of arsenic in a given body is the basis of a murder trial, one can see that justice might easily be defeated. Were Gautier himself testifying, he would say, as he has written, that arsenic could be found in normal human bodies only by the use of a certain very delicate technique, which I need not here describe; that he had found it only in the ectodermic structures, and chiefly in the thyroid gland; that he had never found it in the normal liver or normal stomach or normal muscles. He would add, that even in the thyroid gland he had found it only in minute quantity—about $\frac{16}{100}$ of a milligramme in the average human thyroid; that is to say, in the proportion of about $\frac{1}{4000000000}$ of the average body weight; so that if by any inconceivable post-mortem diffusion the thyroid arsenic should escape into all the tissues, it would be in a proportion absolutely beyond detection—the least that he has been able to detect being $\frac{1}{200000000}$, that is to say, $\frac{1}{200}$ of a milligramme in 100 grammes of tissue. To translate this into grains, it would take 100 thyroids—or, if diffused, 100 entire human bodies—to yield $\frac{1}{4}$ grain of normal arsenic to Gautier's test; or to follow Gautier's fair statement to the letter, even doubling the assumed quantity of normal arsenic in a cadaver to $\frac{32}{100}$ of a milligramme to allow for possible traces in the skin and its appendages, we should need a mass equal to fifty bodies to give us the $\frac{1}{4}$ grain. A simple arithmetic calculation therefore shows that this observation, whatever may be its physiologic importance, has little medico-legal bearing. But the partial expert witness—that is, one who is telling only part of the truth in order to serve one side of the case—might say that Gautier had found arsenic in the normal human body in recognizable quantity and omit to say anything further. Or he might be ignorant of the details of Gautier's studies, even were the attorney for the prosecution sufficiently well posted to inquire concerning

them on cross-examination; and the whole truth thus failing to be brought out, a false impression would be left on the minds of the jurymen. Again, the widespread distribution of arsenic in nature and art might be testified to by expert witnesses, truthfully in a sense, and yet partially, and therefore untruthfully in the large sense. By such testimony a jury might easily be misled as to the real significance of the facts. For this is all matter of fact, not of opinion, whether or not it be matter of personal observation. While, therefore, the mere circumstance that a witness has not personally observed the fact of science concerning which he is questioned should not bar his testimony, it does seem that courts should exercise considerable caution as to the admission of such testimony, and might rightfully insist, first, that its relevancy to the special cause at trial be established; secondly, that the witness should be required to affirm his familiarity with all the pertinent details of the special facts to be testified to, and, furthermore, be required to state them, even in the absence of cross-examination. Failure on the part of a witness to make such full statement should then be considered sufficient reason, if shown, to throw out all his testimony. This rule would at least tend to discourage witnesses from giving partial and misleading testimony.

Another order of testimony given by experts relates to matters purely of opinion. Here the position becomes more difficult both for court and witness.

A pharmacist testifying as a matter of chemical fact that he has found a certain quantity of arsenic or strychnin in a human body, may be asked whether it is sufficient to kill or indicates that there has been in the body at any time sufficient to kill? The least quantity of arsenic or any other poison necessary to kill a human being should be a matter of fact; it is, however, for many reasons, one of opinion. In the first place, the experiment has never been made under rigorous conditions. In the second place, in most, if not all of the recorded cases of poisoning, alike in those attended with recovery and those ending fatally, either the exact quantity taken is unknown, or it is so large that no estimate of a minimum lethal dose can be based upon it—while in cases of recovery from large doses there has often been evacuant, antidotal, or other treatment. In the third place the individual variations in responses to drugs of all kinds are great. Moreover, the hearsay element must be large in

such opinions. A pharmacist has knowledge of the doses ordinarily prescribed, and from his reading has some knowledge of the symptomatology of drug poisoning; but his observation has not been, like the physician's, of a character that such reading may be assimilated therewith; and there thus seems to be a valid objection to the admission of his answer. Similarly he may be questioned as to the harmfulness of adulterants or preservatives of food. Here again his observation is not of such a character that his answer can be anything more than opinion, and the line of his studies does not ordinarily lend authoritative weight to his opinion on such topics. But the physician occupies a different position in respect to these questions. They form an important part of his studies and are integrated with the whole mass of his knowledge. He is therefore entitled to express an opinion concerning them; and although he may never have poisoned any one with boric acid or salicylic acid, deliberately or accidentally, or may never have recognized impure benzoic acid as the cause of stomach and kidney disease in his patients, his opinion that such substances can and do injure the human stomach and kidneys, should be accepted in evidence. *Absence of knowledge* on these subjects, should not, moreover, be twisted by an expert witness into *knowledge of absence* of injurious effects.

Other cases, however, present difficulties to a physician asked to give an expert opinion. Thus, on matters of chemistry and pharmacy outside his experience, his opinions are ordinarily of very limited value. But let us also consider cases that may be within his experience.

A physician who has observed a patient during life and has not suspected poisoning, may, after the death of the patient, have his suspicion aroused, and in reflecting upon the symptoms he may see a new significance in them. This suspicion may be confirmed by the post-mortem examination and the chemical analysis. His honest opinion based upon all the facts may then be different from one previously expressed upon partial knowledge or even embodied in a death certificate. Yet, unfortunately, he is exposed to animadversion because of his change of view. Still more difficult is the question presented in a case of suspected poisoning to a physician who has not seen the living person or the corpse, but is asked to express an opinion, on facts described by others, as to the nature of symptoms during life, and as to the cause of death. Here the ques-

tion is one of pure opinion, for the facts are all beyond his knowledge. It is evident that in the absence of complete and careful observation the facts may be so manipulated as to give apparent basis for discrepant opinions. One set of circumstances is made prominent by witnesses for defence, another by witnesses for prosecution. Few, if any, scientifically accurate observations have been made of symptoms. The autopsy may have been defective in various ways. The testimony of witnesses not only on opposite sides, but on the same side may be contradictory or even in certain particulars self-destructive, from a scientific viewpoint. The physician may thus be inclined to minimize in his own mind certain testimony, which nevertheless he is called upon in his sworn opinion to give credence to. Evidently when he cannot form a positive opinion, it is his duty to say so, and not to attempt to twist dubious or insufficient evidence into the support of a partisan, because partial, view. Again, an expert is forbidden to formulate questions which he is to be called upon to answer, and yet some error in the formulation may apparently color his testimony otherwise than he desires. He must avoid this by so formulating his answer that it shall tell its own story independently of the question, and by limiting his answer so that it may be positive only so far as the facts are positive; and qualified as to uncertainty or probability when the facts so demand.

Many other difficulties affecting expert testimony on pharmacologic questions might be stated, but those discussed seem to be the main ones, and perhaps if they can be averted the others will to a large extent disappear.

In addition to the practice of controlled examinations and exhibition of results already alluded to, I have elsewhere suggested a method that would do away with our main difficulties, but this method is not likely to be adopted for many years, if at all. It is too simple and direct. That method is the submission of purely scientific questions to a commission of experts, who shall, in advance of the jury trial, hear the relevant testimony as to matters of fact, including the methods and results of any scientific examinations, but no mere opinions from witnesses—opinions being put forth by experts frankly appearing as advocates, and arguing upon the testimony submitted. Such a commission could submit to the court a report or reports, which could thus become part of the evidence heard by the jury that has to find the verdict, and before whom no expert should appear as witness.

In the absence of this simple and direct way out of present difficulties, is there any other? Yes—if we, physicians, chemists and pharmacists—choose to take it. When we are called upon to consider the facts in a given case in order to determine their significance, and what testimony we can give concerning them, we should make certain stipulations, and I may add that there is little difficulty in securing the assent of attorneys to reasonable conditions. An attorney who should refuse his assent would, I judge, be a first-class attorney *not* to be associated with. These stipulations are:

(1) That there is no obligation to testify or to give counsel involved in the acceptance of a fee to examine papers or otherwise look into the facts. This is, I believe, usually understood.

(2) That the nature of the testimony to be given, in case the preliminary examination permits an agreement to testify at all, is subject to modification by the subsequent disclosure of new facts at the trial or otherwise; and that the attorney must then decide for himself whether or not to call one as a witness.

(3) That one is to be asked only simple and direct questions permitting the framing of answers that will bring out the whole truth as one sees it, and not merely fragments of the truth.

(4) That one is not to be expected to be positive upon uncertain matters, or to throw doubt upon those that are not doubtful.

(5) That one is not to be asked questions to which correct answers must be highly technical, and which can therefore only obscure the issue. That, indeed, one is not to be asked such questions for the very purpose of obscuring the issue.

[*To be continued.*]

WILLIAM PROCTER, JR., THE FATHER OF AMERICAN PHARMACY.[1]

By John F. Hancock, Baltimore.

I esteem it a privilege to be welcomed by the members of this time-honored institution.

In being your guest this evening my mind reverts to the days

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[1] An address delivered at the Philadelphia College of Pharmacy, on Tuesday evening, December 13, 1904.

that have long since passed, and memory recalls many pleasant associations with the members of your College.

Mentally, I can see the men who made the Philadelphia College of Pharmacy illustrious in the past, and this evening I am pleased to meet with those who have diligently striven to maintain and perpetuate the good character and usefulness of this noble educational work.

For many years your College stood alone, on this vast continent, in providing the means of a systematic course of instruction to those who had elected pharmacy as their life work. Early in the past century your city became the centre of medical and pharmaceutical learning, and there were more celebrities in the two professions—medicine and pharmacy—found here than in any part of the United States. I believe the two professions were more intimately associated in Philadelphia than in any other city of the Union. Educational interests brought them close together in a common cause. This condition of things produced a mutual health and strength, highly beneficial to each, and equally so to the patrons of the two professions.

When I entered the ranks of pharmacy in 1854, exchanging the farm life for that of the city, I soon made the acquaintance of a graduate of your College, who had served an apprenticeship with the late Caleb H. Needles. He came as a clerk to the pharmacy where I was engaged, and I found him a useful companion. In less than two years after entering the business, I became part owner of the pharmacy—the firm being Landis & Hancock, and the clerk referred to remained in our employ, becoming my pharmaceutical instructor. This gentleman made me acquainted with the Philadelphia College of Pharmacy.

The books that engaged my attention at this time were the United States Dispensatory, by Wood and Bache, and Mohr, Redwood and Procter's Practical Pharmacy, edited by William Procter, Jr. Later on I learned to know more of the value of these books and their distinguished authors.

The Maryland College of Pharmacy was reorganized in 1856, and at great inconvenience to myself I matriculated as a student in 1857, and attended the lectures on Chemistry. I was graduated in 1860, joined the College, as a member, one year after, and in 1863 joined the American Pharmaceutical Association.

At this meeting of the Association I made the acquaintance of a distinguished pharmacist of your city, whom I was proud to meet, because I had heard so much of him. My surprise was to find him so approachable and pleasant, for I had thought that his high position would remove him from one so humble as myself. I met him frequently after that meeting, and always found him uniform in his demeanor. Towering above most other men in ability and position, he was kind to the most humble, but always maintained a mild and sympathetic dignity. He was not harsh in criticism, and his mildness of manner would give encouragement to those who were timid. He is not visible with us this evening, but he lives in affectionate memory of those who knew him personally.

I come to you this evening to pay my loving tribute to his memory. It would be useless for me to attempt to eulogize his valued life before an audience in this College. These halls are sacred to his memory. I come to plead with you for a public and lasting recognition of his services in the past, that his example may serve as a beacon, to encourage and stimulate the minds of those who would ennoble the duties of the pharmacist, in the present and future. Let us perpetuate the memory of one who has done so much for humanity by elevating his chosen calling to the dignity of a profession, in having qualified himself for its practice and rejecting the grosser garb of commercial pharmacy.

You have had in your College, since its organization in 1821, many examples of noble worth in its membership, and in those who, having graduated, have done missionary work in distant places. Their names are too numerous to mention, but you have had only one William Procter, Jr., and I venture to state that no one here will suggest his superior, past or present, in the ranks of pharmacy on the American Continent. As apprentice, college student, alumnus, professor, editor, author, he distinguished himself in each position, and never accepted any duty that he was not qualified to fill with credit to himself. His collateral studies and investigations had the object of magnifying the importance of pharmacy. He was constant and unabating in his efforts from the beginning to the end of his pharmaceutical career, and none knew it better than those I now address. Others may have shown superior ability in some directions, but his was a substantially rounded life, useful to others and an honor to himself.

Should such a life be passed into forgetfulness, and can it be regarded as ostentatious, to preserve such a memory in a substantial and public way? Is there any one present who would not mark the resting-place of a departed loved one with a stone, however humble, in commemoration of the lost friend or relative? If, by common consent, we accept the late William Procter, Jr., as the Father of American Pharmacy, should we not, as his children by adoption, commemorate the fact, and call the attention of future generations of pharmacists, druggists and chemists to his spotless reputation? I claim that it would not only be an honor to his memory, but also to those who recognize his worth and to American Pharmacy.

It would be useless at this time to recite the ancestry of this good man or to relate in detail what he did for pharmacy and pharmacists. The pages of The American Journal of Pharmacy and the proceedings of the American Pharmaceutical Association will fully gratify any one who wishes detailed information on the subject.

I am proud that he was a son of Baltimore, and equally so to know that he achieved his noble character and reputation in the city of Philadelphia. The tribute that I think should be paid to his memory is not for local fame. Living as he did, at about what was then the centre of population in the United States, there were drawn to him the youthful minds, from all directions and long distances, those who were prepared by him and his colleagues in the College for the higher duties of pharmacy. On returning to their respective homes these graduates of your College have been important factors to their Alma Mater.

The radiations from the centre were, in the many cases under my observation, impregnated with the noble principles of Procter, that made them more useful in the practice of pharmacy than they might have been under less favorable circumstances. Unfortunately, the teacher does not always reflect seriously his moral forces on the mind of the pupil.

We can not regard the late Professor Procter as a brilliant or smart man in the sense in which these terms are generally applied. The terms able, strong, reliable would have been more applicable in his case. He was a great and just man, and, beyond all, a gentleman.

Let us briefly survey what he achieved and the difficulties he must have encountered. At the age of three years death robbed

him of the support of his father. His mother was left with a large family of children and limited means, which deprived him of the advantages of a liberal education. One of his schoolmates related that "the boy William was studious, gentle and companionable, and greatly beloved by his teacher and classmates." William was taken from school at an early age to look after business interests for his mother. At the age of fourteen years he went to Philadelphia to visit a friend of his mother; at this time he made the acquaintance of the late Joseph C. Turnpenny, who was an apprentice with Henry M. Zollickoffer, at the corner of Sixth and Pine Streets. Young William Procter, Jr., became very much interested in the adopted business of his young friend, and without delay offered himself to Mr. Zollickoffer as an apprentice, which offer was accepted. The two lads were mutually interested in the study of pharmacy, Turnpenny graduating in 1833 and Procter in 1837. The two worked together as members of your College, until separated by the death of Procter.

From the beginning of William Procter's experience in pharmacy, he was a sober, painstaking, industrious student, verifying by experiments what he had learned from the study of books. His searching inquiry, integrity of purpose and unostentatious display of what he had learned, together with the love of imparting knowledge, ripened into a rich harvest of useful information that made him an authority in whatever he attempted to teach. We should not only feel a keen appreciation of his moral and intellectual worth, but seek to demonstrate it in a way to make his example most impressive on the lives of others. His disciples should not be the only ones to honor his memory and profit by his example, but physicians as well, and those who patronize them should be made acquainted with his noble character, that they may properly respect and estimate what the life and works of Procter have meant to pharmacy. For the standard which he upheld for so many years and labored to make possible for others, and in which he assisted his colleagues to establish in the practice of pharmacy, should receive the highest commendation of all classes.

The pharmacist occupies a peculiar position in the community, in being both a professional and a trades man. Professional ethics and commercial interests are often inharmonious. Unlike the professions generally, the ethical pharmacist is subservient to the physi-

cian, who naturally precedes him in attendance on the sick. The physician deals with the head of the home, and the pharmacist, in many cases, with servants and children. In the social life the physician holds the higher position and his duties are not so much of a drudgery.

The pharmacist has too many interests to serve, and it becomes very difficult for him to keep evenly poised. Should he lean to the commercial side and cater to the whims and wishes of public patronage, he is likely to offend physicians. Should he assume the ethical conduct of the professional side of pharmacy the public may lose interest in him. To be a money maker, commercial tact is necessary. To be an ideal pharmacist, one must adopt the Golden Rule for his guide and conduct. To support the dignity of his profession may result in appeasing his conscience rather than filling his purse. Should he be a commercial artist he is more likely to become popular with the masses, if he can succeed in posing as an ethical pharmacist while practising the schemes of the quack.

Professor Procter seems to have harmonized the various conflicting interests without sacrificing his self-respect. At least, while he was teacher, editor and essayist, his pharmacy did not suffer, as has been the case with some who have diverted their attention from the main issue. In all his varied interests none were seriously neglected, and he was confided in and respected in them all. He demonstrated the fact that one with scientific and practical qualifications, supported by industry, economy, good judgment and conservative integrity, can succeed in the practice of pharmacy, and should he not bequeath to his family a large financial fortune, he may leave a good name and a good example, which, after all, is the richest inheritance of humanity. Not by leaps did he ascend to the summit, but by systematic and persistent climbing. On reaching the goal, he remains the central figure in the pharmaceutical group.

The late Professor Huxley remarked on one occasion "that a good teacher is not usually a fluent speaker." This would apply to our late friend, yet he was an interesting speaker, and those who knew him well had implicit confidence in his statements. In debate he was respectful and convincing; as a writer he was clear and logical; as an investigator, painstaking and thorough; as a chemist and pharmacist, thoroughly reliable; in judgment, broad and liberal; and, as a companion, cordial and sincere. In the constancy

of his work, his ability, responsibility and the results of his many years of uninterrupted labor in the promotion of pharmacy, he was the acknowledged superior of all American pharmacists, and enjoyed both a national and international reputation for his achievements.

I claim, therefore, that his memory is worthy of our highest consideration, and that a monument to Prof. William Procter, Jr., the father of American pharmacy, should be erected at the national capital, and that a portion of the Smithsonian grounds should be requested as the most suitable site.

At the annual meeting of the Maryland Pharmaceutical Association in 1903, the following resolution was adopted:

Resolved, That the Maryland Pharmaceutical Association favors the erection of a bronze statue of William Procter, Jr., the father of American pharmacy, in the Smithsonian grounds at Washington, D. C., as the most fitting testimonial of that illustrious pharmacist, under such rules and regulations as may be necessary.

A committee on the Procter monument, of the same association, made a report, and a similar resolution was unanimously passed at its meeting this year. Maryland is on record favoring the monument. At the meeting of the American Pharmaceutical Association in Kansas City this year, I had the honor to read a paper favoring this movement.

And at the last general session I offered the following, which was adopted without a dissenting voice:

WHEREAS, The American Pharmaceutical Association from its inception has enrolled as members the most reputable and accomplished pharmacists and druggists of America, who, by the character of their annual contributions, have made it an ideal organization; and

WHEREAS, One of its founders, the late Prof. William Procter, Jr., became its most distinguished and honored member, through his untiring energy, ability and valued services to the close of his life; therefore be it

Resolved, That a committee of five be appointed by the president, said committee to be known as the Committee on the William Procter, Jr., Monument Fund, whose business it shall be to solicit subscriptions for a memorial monument.

Resolved, That when a sufficient amount shall be collected by subscriptions, this Association shall authorize and have erected in

the Smithsonian grounds at Washington, D. C., a bronze monument commemorative of the late William Procter, Jr., the father of American pharmacy.

Resolved, That the committee be authorized to invite the co-operation of the various State pharmaceutical associations, and all other bodies and individuals in sympathy with the undertaking, and that due credit be given to each subscriber.

Resolved, That the American Pharmaceutical Association shall be the custodian of all funds collected, and shall disburse the same for the object herein named, under such rules and regulations as may be adopted.

The committee provided for by the resolution has been appointed by President Beal, as follows: Henry Kraemer, of Philadelphia; Frank C. Henry, of Washington, D. C.; Benjamin T. Fairchild, of New York; C. S. N. Hallberg, of Chicago; John F. Hancock, of Baltimore. The committee will soon be organized for work, and they will have to formulate a plan of procedure. We need all the light and assistance we can possibly get, believing that by united action the money necessary can be collected through the American Pharmaceutical Association, the State pharmaceutical associations and any other bodies and individuals interested in the laudable work.

THE ANATOMY OF EDIBLE BERRIES.

By A. L. Winton.

(*Concluded from p. 545.*)

THE AMERICAN GOOSEBERRY (*Ribes oxyacanthoides* L.).

American cultivated gooseberries are largely derived from the native species *R. oxyacanthoides* L. The Downing, the variety studied by the writer, is believed by Bailey[1] to be a descendant of this species.

Macroscopic Structure.—The gooseberry has much the same general structure as the currant, but the fruit is larger (1 to 2 centimeters in diameter), the calyx and style are longer (6 millimeters in length), and are pubescent, and the smooth pericarp is thicker (*Fig. 22*). The gelatinous coat of the seed is thicker (often 2 millimeters thick

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[1] *Loc. cit.*, p. 393.

on the raphe side), but the seed freed from this coat is about the same size as in the currant, although somewhat narrower and more nearly terete. Unlike the European gooseberry, the surface is free from prickles.

Histology.—Pericarp.—(1) The Epicarp and (2) Hypoderm are practically the same as in the red currant.

(3) Mesocarp.—This layer is composed of extraordinarily large cells (often 0·5 millimeter in diameter), which are evident to the naked eye and are separated from each other by a network of cells hardly 0·05 millimeter in diameter. In the inner layers the small cells are less numerous or entirely lacking. Crystal clusters are abundant, particularly in the inner layers.

(4) Endocarp.—The most striking histological distinction between the currant and the gooseberry is in the structure of the endocarp,

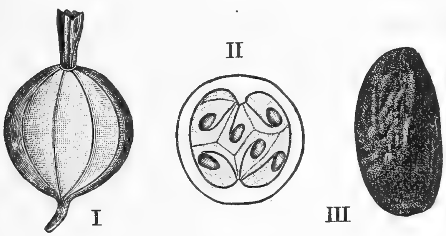

FIG. 22.—American Gooseberry (*Ribes oxyacanthoides*). I Whole fruit, × 1. II Transverse section of fruit with seeds, × 1. III Seeds deprived of gelatinous coat, × 8.

which in the currant is a dense sclerenchymatous tissue, in the gooseberry a layer of parenchyma cells with walls so thin that they are studied with difficulty. This remarkable difference in structure of two fruits of the same genus led the writer to examine the fruit of *R. aureum*, the only other species of this genus available for study. In this fruit, which resembles more the black currant than the gooseberry, the endocarp cells, although apparently parenchymatous, had thicker walls than those of the latter, and the cells were arranged in a manner similar to those of the sclerenchymatized endocarp of the currant. A study of this coat in other species, and in all stages of development, would doubtless disclose other intermediate forms.

Testa, Endosperm, and *Embryo.*—The microscopic structure of the seed is practically the same as that of the currant seed.

Floral Parts (*Fig. 23*).—The remains of the floral parts are usually deep brown, and can be studied to advantage only after bleaching, preferably with sodium hypochlorite, and staining. A prominent mid-vein runs from the base almost to the summit of each of the calyx and corolla lobes. About four secondary veins branching near the base, partly from the calyx midrib, partly from the corolla midrib, also run through nearly the length of the calyx lobes. Lateral branches from the midrib are numerous in the corolla, less so in the calyx.

The epidermal cells of the calyx are for the most part slightly elongated, and are arranged end to end in longitudinal rows. Near the ends of the lobes they have wavy outlines. The outer surface of the calyx and the upper part of the inner surface bear only a few

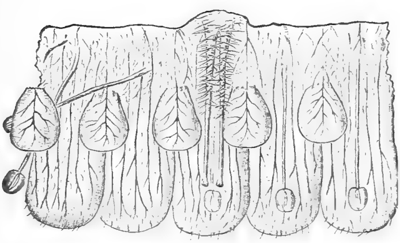

FIG. 23.—Gooseberry. Floral parts. × 5.

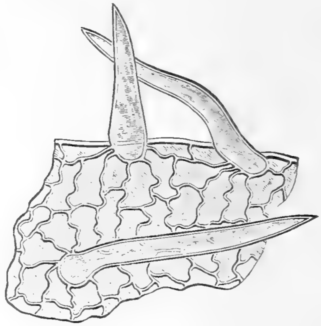

FIG. 24.—Gooseberry. Epidermis from margin of calyx, with hairs. × 160.

scattering hairs. The calyx throat, however, is densely pubescent. These hairs are all thin-walled, and vary in length up to 1 millimeter or more, the longest being in the calyx throat (*Figs. 24* and *25*).

The deeply parted styles are covered with epidermal cells, for the most part quadrilateral, and arranged end to end in rows, and on the lower half bear numerous thin-walled hairs 1 millimeter or more in length.

Microscopic Examination of Gooseberry Preserves.—The epidermis, mesocarp and seed have the same structure as the corresponding parts of the currant, but the endocarp is not sclerenchymatized as in the latter fruit and is not evident in preserves. The floral parts are of about the same length as in the black currant (6 millimeters)

but the calyx throat and the styles bear numerous long hairs, whereas these parts in the black currant are smooth, or only sparingly pubescent.

THE EUROPEAN GOOSEBERRY (*Ribes Grossularia* L.).

The European or prickly gooseberry, owing to the mildew to which it is subject, is not so successfully grown in America as the smooth-berried varieties derived from native species. Some of our

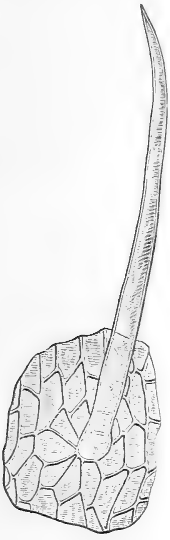

FIG. 25.—Gooseberry. Epidermis from throat of calyx, with hair. × 160.

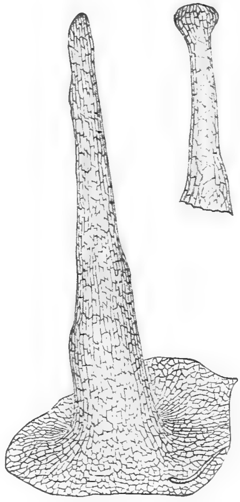

FIG. 26.—European Gooseberry (*R. Grossularia*). Prickles with and without globular head. × 32.

popular varieties, however, have a few prickles on the fruit, and have doubtless European ancestors.

Garcin[1] describes the microscopic structure of the pericarp of *R. Uva-Crispa* (*R. Grossularia*). Blyth[2] devotes but a single sentence to the gooseberry, evidently the common European species.

A study was made by the writer of the berries of "Carmen," a prickly variety grown in the Station garden; and also of an unknown variety, unquestionably *R. Grossularia*, grown in Scotland.

[1] Recherches sur l'histogénèse des péricarpes charnus. Ann. sc. nat. Botanique, 7e series, 1890, **12**, p. 175.

[2] *Loc. cit.*, p. 162.

Except for the prickles, the structure of both is the same as of the fruit of *R. oxyacanthoides.*

The Prickles have a broad base and are often over 1 millimeter long. Some have a blunt point, others a head of globular form. Both forms are shown in *Fig. 26.*

The Epidermal Cells of the prickles are elongated, and are arranged end to end in longitudinal rows. At the base they pass into the isodiametric cells of the epicarp.

THE CRANBERRY.

Bailey writes of this fruit as follows:[1]

"The cranberry (*Vaccinium macrocarpon* Ait.), the most unique of American horticultural products, was first cultivated, or rescued

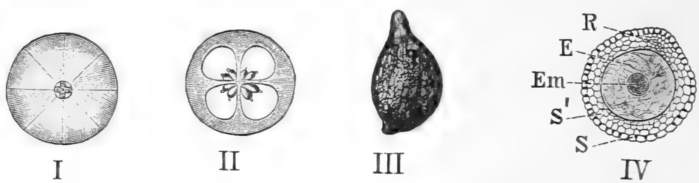

FIG. 27.—Cultivated cranberry (*Vaccinium macrocarpum*). I Berry seen from above, × 1. II Transverse section of berry, × 1. III Seed, × 8. IV Transverse section of seed, × 15. S, epidermis of testa; S′, inner testa; R, raphe; E, endosperm; Em, embryo.

from mere wild bogs, about 1810. Its cultivation began to attract attention about 1840, although the difficulties connected with the growing of the new crop did not begin to clear away until about 1850. Cape Cod was the first cranberry-growing region, which was soon followed by New Jersey, and later by Wisconsin and other regions. The varieties now known are over a hundred, all having been picked up in bogs, and the annual product from tame bogs in the United States is more than 800,000 bushels. . . .

"This cultivated cranberry is *Vaccinium macrocarpon* Ait. There are other edible species, but they are not cultivated. The cowberry, or mountain cranberry, *Vaccinium Vitis-Idaea* L., is gathered in great quantities in Canada, where it is used for sauces. It is also native to Europe, where it is also much prized as a culinary fruit."

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[1] *Loc. cit.*, pp. 414, 424.

Macroscopic Structure.—Different varieties of the cultivated cranberry vary in shape (spherical, oval, pear-shaped), in color (pink, red, maroon, mottled), and in size (diameter up to 15 millimeters).

The epicarp is smooth, and bears on the summit four short tooth-like calyx lobes, which are usually bent inward. Between the calyx lobes is a circular spot with a dot in the centre, formed by the dropping of the floral parts.

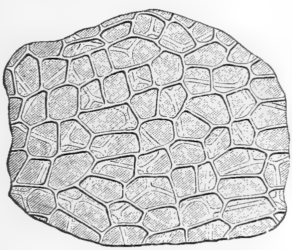

FIG. 28.—Cranberry. Epicarp and hypoderm. × 160.

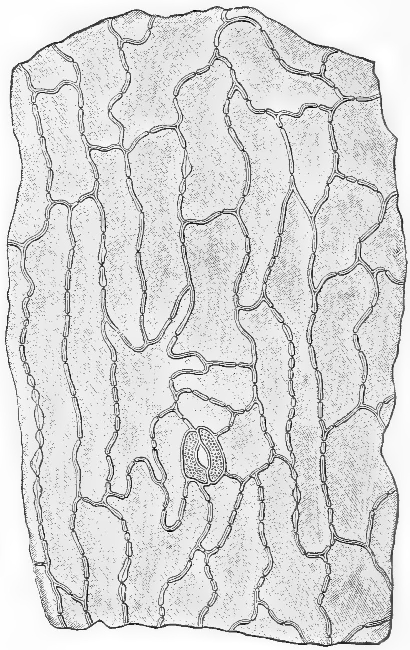

FIG. 29.—Cranberry. Endocarp with stoma. × 160.

The berry is four-celled, each cell containing on a central placenta a number of seeds which fill only a small part of the otherwise empty cavity (*Fig. 27*).

In the nearly ripe fruit only the epicarp is colored, the other parts being white; but in the fully ripe fruit all the tissues are usually red.

The yellow short-beaked seeds have a thick testa and a bulky endosperm, with an elongated embryo of moderate size, consisting chiefly of the radicle, in the axis.

The mountain cranberry has practically the same macroscopic structure as the cultivated species, but is much smaller.

Histology.—The following description applies to both the culti-

vated and the mountain cranberry, the two being nearly, if not quite, identical in microscopic structure.

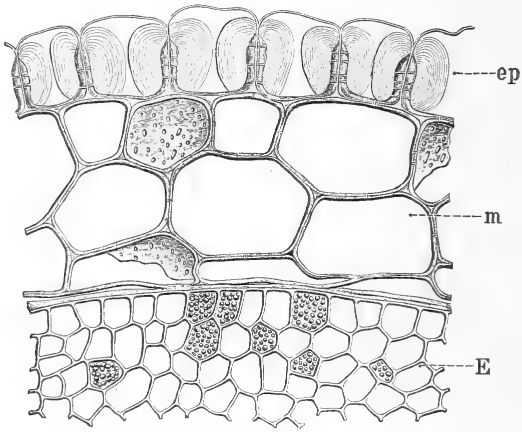

FIG. 30.—Cultivated Cranberry. Seed in transverse section. ep, epidermis of testa with sclerenchymatized and mucilaginous layers; m, inner testa; E, endosperm. × 160.

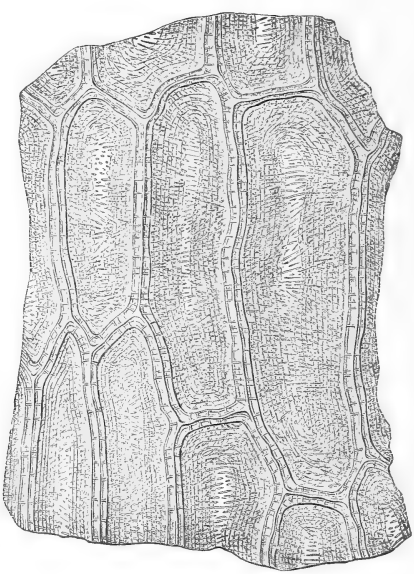

FIG. 31.—Cultivated Cranberry. Epidermis of testa in surface view. × 160.

Pericarp.—(1) The Epicarp (*Fig. 28*) is very simple in structure, with cells as seen in surface view from 0·02 to 0·05 millimeter in

diameter, and cell walls about 0·003 millimeter thick. Cross-sections show that this layer is about 0·025 millimeter thick and that the cuticle is strongly thickened.

(2) The Hypoderm (*Fig. 28*) is for the most part only one cell-layer thick, and the cells are more or less isodiametric in cross-section. Evaporation is largely prevented by the thick cuticle, rendering a more strongly developed hypoderm unnecessary.

(3) The Mesocarp cells are mostly isodiametric, and range up to 0·20 millimeter in diameter, but in the partitions of the fruit cavities they are somewhat smaller.

(4) The Endocarp (*Fig. 29*) is from 0·02 to 0·05 millimeter thick and is made up of a single layer of cells. As is seen in surface preparations, the cells are for the most part longitudinally extended and are more or less curved or wavy in outline. The indistinctly porous cell walls are somewhat thicker than those of the mesocarp, but unlike those in some *Vaccinium* species are not conspicuously

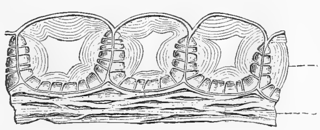

FIG. 32.—Mountain Cranberry (*Vaccinium Vitis-Idaea*). Transverse section of testa. × 160.

sclerenchymatized. Although stomata are entirely lacking in the epicarp, it is a remarkable fact that they occur in considerable numbers in the endocarp.

Testa.—(1) Epidermis (*Fig. 30*, ep, *Fig. 31*).—Of all the tissues of the cranberry, this layer is the most characteristic and remarkable. The cells in the mature seed range in width up to 0·1 millimeter and in length up to 0·4 millimeter, but in abortive seeds are much smaller. As is seen in cross section, the outer walls (*Fig. 30*, ep) are thin and convex, but the deep yellow or brown inner and radial walls are sclerenchymatously thickened (double radial walls often 0·02 millimeter thick), and in addition the radial walls and sometimes the outer and inner walls have a transparent mucilaginous layer of distinctly stratified structure which nearly fills the cell cavity. Treated with zinc-chloride-iodine the mucilaginous formation is stained blue, the cell walls proper remaining yellow. In *V. Vitis-Idaea* the outer and inner walls often have a swollen

layer, but this may also occur in *V. macrocarpon* and may not be characteristic of the former species (*Fig. 32*). The sclerenchymatous radial and inner walls are pierced with numerous pores which, in the immature or abortive seeds, are nearly circular, but in the fully ripe seeds are usually much elongated.

(2) Inner Testa.—The remainder of the testa consists of two or three layers of large thick-walled porous cells, the innermost layers being more or less collapsed. In dried or cooked specimens, all of these cells are collapsed (*Fig. 30*, m).

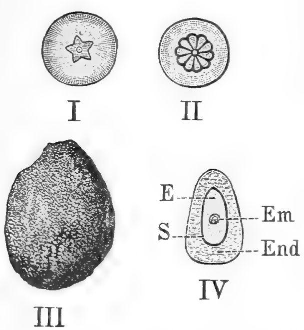

FIG. 33.—Huckleberry (*Gaylussacia resinosa*). I Fruit seen from above, × 1. II Transverse section of fruit, × 1. III Stone, × 8. IV Transverse section of stone, × 8. End, endocarp; S, testa; E, endosperm; em, embryo.

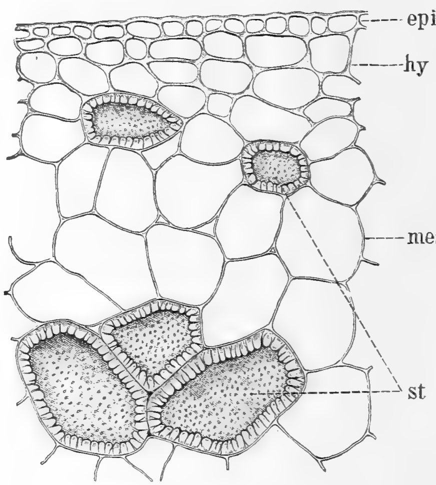

FIG. 34.—Huckleberry. Transverse section of outer portion of the pericarp. epi, epicarp; hy, hypoderm; mes, mesocarp; st, stone cells. × 160.

Endosperm (*Fig. 30*, E).—The average diameter of the cells is 0·035 millimeter. Protein grains are present throughout; starch is entirely absent.

The Embryo is not interesting in its microscopic structure.

Microscopic Examination of Cranberry Preserves.—Fragments of the epicarp and endocarp (the latter with stomata), bundles from the mesocarp, and seeds, may be found in preserves. The large porous epidermal cells of the testa with sclerenchymatous and mucilaginous layers are especially characteristic and may be studied in surface preparations. In unripe or abortive seeds these cells are smaller, thinner-walled, and have pores more nearly round than in the mature

seeds. Isolated stone cells detached by cooking from the testa of immature seeds, sometimes occur in the gelatinous portion of the preserve.

THE HUCKLEBERRY (*Gaylussacia resinosa* Torr. and Gray).

This berry is abundant in the northern United States, and furnishes large quantities of fruit for the market. So far as the writer can learn, it is not cultivated; but some of the blueberries (*Vaccinium*), which are closely allied botanically and are similar in appearance and flavor, are now being improved by Munson[1] at the Maine Agricultural Experiment Station.

Macroscopic Structure.—The huckleberry is globular in form, blue-black in color, and 1 centimeter or less in diameter (*Fig. 33*, I and II).

It is not a true berry, but a ten-celled drupe, the hard coverings of the so-called seeds being the inner walls of the pericarp cells.

The epicarp is smooth and the fruit is crowned with five pointed calyx lobes much like those of the cranberry. In the centre, between these lobes, is a small depression, the scar of the style.

The pits are closely crowded about the axis and as a consequence are wedge-shaped (*Fig. 33*, III and IV). Under the hand lens they have a rough granular appearance.

Within the thick endocarp is the seed with a thin testa and a bulky endosperm; in the axis of the endosperm is an elongated embryo.

Histology.—Pericarp.—(1) Epidermis (*Fig. 35*, epi).—Surface mounts show the cells of this layer to be much the same in form and size as those of the cranberry epicarp; cross-sections, however, show that the cuticle is much thinner.

(2) The Hypodermal Coat (*Fig. 34*, hy) is several cell-layers thick, and thus furnishes a protection against evaporation, which is not necessary in the case of the cranberry owing to its thick cuticle.

(3) Mesocarp (*Fig. 34*, mes).—Owing to the presence of numerous stone cells (st) this layer is strikingly different from the mesocarp of the other small fruits investigated, but resembles that of the quince and pear, although the stone cells are thinner walled and the parenchyma cells about them are not strongly elongated, and are

[1] Maine Ag. Ex. Sta. Rep. 1898, 164–172. Bul. 76, August, 1901. Am. Gard. **20**, 1899, 852.

not arranged in a marked radiating pattern. These stone cells are angular or elliptical and vary in diameter up to 0·2 millimeter. The walls (0·02 millimeter or less thick) are pierced with numerous small pores. They occur either singly or in groups throughout the mesocarp, and may be readily separated from the soft tissues by pressure.

(4) Endocarp (*Fig. 35*, end).—Most of the elements of this hard coat are stone cells, about the same size and shape as those of the

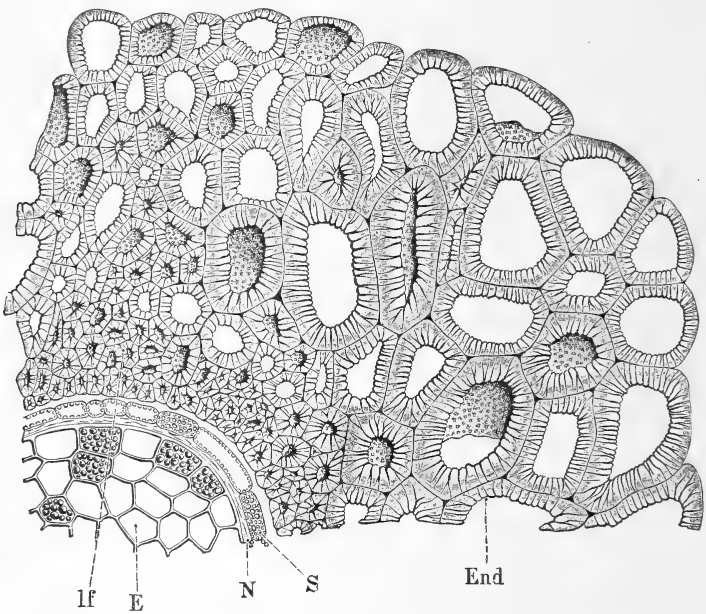

FIG. 35.—Huckleberry. Transverse section of endocarp and seed. end, endocarp with large isodiametric stone cells and lf, narrow longitudinally extended fibers; S, testa; N, hyaline layer (nucellus); E, endosperm. × 160.

mesocarp (although usually thicker-walled), but in the wall adjoining the mesocarp there is a group of narrow sclerenchymatous fibers running parallel with the axis of the fruit and similar fibers form the inner layer of the coat.

The pits of the huckleberry crush more readily between the teeth than those of the bramble fruits, owing to the larger size of the stone cells and the relatively larger cell cavities.

Testa (*Fig. 35*, S).—There is but one layer of cells in this coat, which may be removed after cutting off the endocarp and studied

in surface view (*Fig. 36*). Most of the cells are of fantastic form with wavy outline, and often reach a length of 0·2 millimeter. The walls are beautifully reticulated, the nearly circular pores being 0·004 millimeter in diameter. This coat is highly characteristic. The raphe is not conspicuous.

The Endosperm (*Fig. 35*, E) *and Embryo* are much the same in structure and form as in the cranberry.

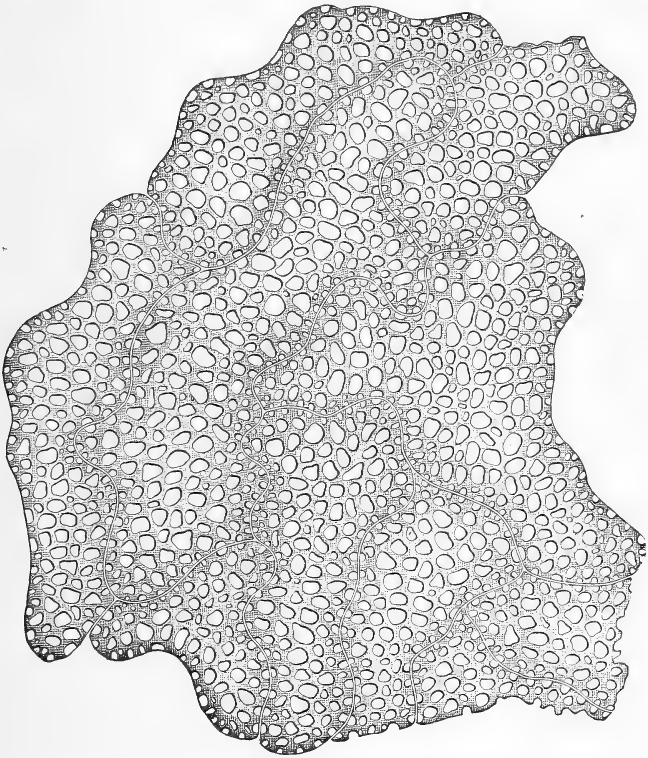

FIG. 36.—Huckleberry testa in surface view. × 300.

Microscopic Examination of Huckleberry Preserves.—The characteristic elements of the huckleberry which may be found in preserves are the large stone cells of the mesocarp and endocarp, and the reticulated cells of the testa. Stone cells of the mesocarp are distributed throughout the preserve, but those of the endocarp should be examined in transverse section. The testa is best seen in surface preparations.

EDITORIAL.

THE PROCTER MONUMENT.

The Pharmaceutical meeting held at the Philadelphia College of Pharmacy on Tuesday evening, December 13th, might be fittingly styled a Procter Memorial Meeting; the occasion furnishing a beautiful tribute to the memory of Professor William Procter, Jr. It must have been exceedingly gratifying to those of his family who were present, to hear not only the encomiums of his work as a teacher, scientist, author and editor, but also to hear the words of deep affection of those who had a personal acquaintance with him. The presence of Dr. Hancock from Baltimore, the birth-place of William Procter, in the hall of the institution where he achieved his renown, was significant as showing the general esteem in which his memory is held, and as further indicating that the movement to honor him is destined to succeed.

It is not too much to say that Professor Procter did more in his various capacities to place American pharmacy on a professional basis than any other man. As a professor he recognized the obligations of the teacher, not only imparting instruction in the special branch which he taught, but also training his students in the consideration of the higher ethical problems of the profession. As an editor he showed how keenly he appreciated the responsibilities in the conduct of a journal. As a member of the American Pharmaceutical Association he showed to the fullest extent what membership in an association of this kind involves.

American pharmacy to-day is greatly in need of high ideals and there is a necessity of keeping before our minds the worthy examples of our calling; the more we can symbolize and memorialize the qualities of those who raised this calling to the rank of a profession the better it will be for the future of this pro ession. The tendencies in pharmacy at the present time are entirely too utilitarian, and we can never hope to raise pharmacy to a higher plane until we have changed the mental attitude of pharmacists themselves. By putting aside the utilities for a season let us hope that we will be able to carry on a work to completion which will not only be an honor to one of the most distinguished men in American pharmacy, but will also have an educational value in showing to the world that there is a profession of pharmacy, and in showing to pharmacists that they have a profession to maintain.

The movement to honor the memory of Professor Procter in a tangible way may be said to have begun at the Put-in-Bay meeting of the American Pharmaceutical Association, when after the report of the Committee on Semi-Centennial Celebration, Albert E. Ebert said (See Proc. A.Ph.A., 1899, p. 114):—

If that committee is to be continued I would like to draw their attention to one feature. There is one man who belonged to this association—he was one of the founders of the association—who is seemingly forgotten. He is the father of pharmacy of this country, and that is William Procter. It seems to me, without saying anything against the other men who have lived and worked for the advancement of pharmacy and this association, that it is possible or this association at the time of our fiftieth anniversary to do something to commemorate his valuable work; it would be a grand thing for the association. There has been no man associated with this organization who has done so much, who has been such a faithful servant of this association in times gone by, who cared for it to that extent that William Procter did; and I hope in some way, when we meet in Philadelphia in 1902, that his memory, above all others, will be brought out in a way to hand it down to the twentieth century, because we are somewhat forgetting the grand work William Procter has done for American pharmacy.

At this same meeting Mr. Ebert told the editor of this JOURNAL that some years before he had spoken to the late Professor Trimble about this matter and he seemed to feel that we should take the initiative in an effort to revive the memory of Professor Procter, whereupon the editor of this JOURNAL, who was also secretary of the Committee on Pharmaceutical Meetings of the Philadelphia College of Pharmacy, invited Professor Remington to prepare a memorial sketch of Professor Procter for presentation at one of these meetings, but as the time was approaching for the annual meeting of the American Pharmaceutical Association it was thought better to present it there. This address was subsequently published in the Proceedings of the A. Ph. A. (1900, p. 22) and in this JOURNAL (June 1, 1900), where we also published a portrait of Professor Procter, as he was better known perhaps to those who still recollect him, and which was taken from the oil painting in the museum of the Philadelphia College of Pharmacy.

In the same year (October, 1900) we published letters containing some recollections and reminiscences of Prof. Procter from Frederick Hoffmann, James T. Shinn and George W. Sloan. In an editorial published in the November number were considered some of the forms of memorials which would be most suitable as a testimonial to Professor Procter. During the next year (February, March and

April) this matter was further discussed by various members of the Association in a series of letters. The following are the names of those who contributed to this discussion :—

Frederick Hoffmann,
W. L. Scoville,
J. U. Lloyd,
J. M. Good,
Albert B. Prescott,
S. W. Fairchild,
Horatio N. Fraser,
W. M. Searby,
S. A. D. Sheppard,
J. H. Beal.
George W. Sloan,
H. V. Arny,
J. F. Patton,
A. R. L. Dohme,
Frederick J. Wulling,
Joseph Helfman,
G. H. C. Klie,
A. B. Lyons,
Edward Kremers,
F. B. Power,
J. E. Morrison,
H. M. Whelpley,
E. L. Patch,
William C. Alpers,
R. G. Eccles,
F. G. Ryan,
L. E. Sayre,
H. P. Hynson,
H. M. Whitney.

It looked at one time as though there was a possibility of starting a movement favoring the establishment of a research laboratory in honor of Professor Procter and various members of the Association were invited to express their opinion of the matter (AM. JOUR. PH., May, June, July and August, 1901). Replies were received from the following :

A. B. Prescott,
J. N. Hurty,
Leo Eliel,
W. S. Thompson,
Edsel A. Ruddiman,
E. L. Patch,
H. V. Arny,
J. O. Schlotterbeck,
Frederick J. Wulling,
A. R. L. Dohme,
W. M. Searby,
L. E. Sayre,
Merck & Co.,
E. Fougera,
R. G. Eccles,
The Wm. S. Merrell Chemical Company,
Lehn & Fink,
Johnson & Johnson.
Frederick Stearns,
Horatio N. Fraser,
John F. Patton,
Charles Caspari, Jr.,
Joseph P. Remington,
C. Lewis Diehl,
John Uri Lloyd.

In his address before the American Pharmaceutical Association in 1901, President John F. Patton referred to the proposed Procter memorial, whereupon a resolution was adopted favoring the appointment of a Procter Memorial Committee, which committee was subsequently appointed by President Whelpley and made a report at the semi-centennial meeting in Philadelphia in 1902 (this

JOURNAL, 1902, p. 488). At this same meeting a memorial sketch was read by Albert E. Ebert at the special jubilee session (this JOURNAL, 1902, p. 461). The Committee of the A. Ph. A. made a report at the Mackinac meeting in 1903. At this same meeting John F. Hancock presented a paper advocating the establishment of a monument as a memorial to Professor Procter. A similar paper appeared in this JOURNAL in July, 1903. The matter was again brought to the attention of the Association last year by Mr. Hancock, and the Association has taken official action in the matter and appointed a Procter Monument Committee.

Meantime the question of a Procter Memorial has been considered by several of the State Pharmaceutical Associations and a number of them have evinced a cordial interest in the matter, and at the present time at least two of them, viz., the Maryland and New Jersey Associations, have committees for considering the matter and stand ready to co-operate with any national movement.

It is thus seen that the idea of a Procter monument has been in process of evolution for a number of years and with the form of memorial fixed it is sincerely hoped that all of those who have the best interests of American pharmacy at heart will join heartily in a work which will reflect everlasting credit upon the pharmaceutical profession in America.

TRIBUTES TO THE MEMORY OF PROFESSOR PROCTER.

At the Pharmaceutical meeting on Tuesday evening, December 13th, the following tributes were paid to the memory of Professor Procter:

PRESIDENT HOWARD B. FRENCH

in introducing Dr. Hancock, said:

Professor William Procter, Jr., one of the most esteemed members of the faculty of our College and one of the most influential characters in American pharmacy, was born on May 3, 1817, in the city of Baltimore. He came to Philadelphia in 1831 and entered the drug business as an apprentice, and was graduated from our College in 1837.

On September 21, 1846, the chair of pharmacy was established in this College, and Professor Procter was made the first incumbent, holding the chair until March 16, 1866, when he resigned.

Professor Procter was also editor of THE AMERICAN JOURNAL OF

PHARMACY from July, 1850, until April, 1871. He was one of the founders of the American Pharmaceutical Association. Indeed it would seem that his work in this Association was co-ordinate with his work in the Philadelphia College of Pharmacy. It is perhaps not too much to say that up until a few years ago the American Pharmaceutical Association was looked upon, in a measure at least, as being the child of the Philadelphia College of Pharmacy.

In 1899 Mr. Ebert, of Chicago, suggested that something be done to revive the memory of Professor Procter. The matter has been considered by the American Pharmaceutical Association, by some of the State Pharmaceutical Associations, and has been considered at length in the columns of THE AMERICAN JOURNAL OF PHARMACY.

The American Pharmaceutical Association has now appointed a committee to devise ways and means for erecting a monument to the memory of Professor Procter, and Dr. John F. Hancock, one of the best known manufacturing pharmacists of Baltimore, is chairman of this committee. Dr. Hancock was a personal friend of Professor Procter, and will address us this evening on "William Proctor, Jr., the Father of American Pharmacy."

PROFESSOR JOSEPH P. REMINGTON,

at the conclusion of Dr. Hancock's address (see page 13), said:

I am pleased to welcome Mr. Hancock and thank him for his eloquent tribute to the memory of William Procter, whose assistant I was, and whom I knew most intimately for eleven years, and for two years was in almost daily contact with him.

Mr. Hancock has dwelt upon his professional career; this was all and more than he described, but great as he was as a pharmacist, he was even greater as a man. It is well that he should be called "the Father of American Pharmacy." He labored at a time when this College was small and pharmacy in this country was in its infancy. He was the first professor of pharmacy in this College, and probably the first in America. In those days, before the chair of pharmacy was founded, chemistry and materia medica were the only branches taught at college, and pharmacy was taught in the store. Under Professor Procter's initiative the "rule of thumb" method of teaching was followed by systematic and graded instruction. The syllabus on pharmaceutical subjects, originally proposed

by Soubeiran and modified by Professor Procter, is the basis to-day of the best classification that we have.

It is meet and proper that Mr. Hancock should come to us from our sister city in this brotherly and kindly way and tell us of the movement which he has started to honor the memory of this great man. The Philadelphia College of Pharmacy will do its full duty. I might mention the fact as showing his powers of concentration that Professor Procter performed his literary duties coincidently with his practical store duties. Those matchless editorials and lucid papers whose meaning could be grasped alike by student and scholar, were often prepared at his little desk near the prescription counter, from whence at any moment he might be called upon to wait upon a customer. But there is his monument—in his daily life; the original work, the hundreds of papers to be found in the AMERICAN JOURNAL OF PHARMACY and the Proceedings of the American Pharmaceutical Association, covering every class of pharmaceutical subjects.

He was a genius, if by this is meant the capacity for great labor. I assure you, Mr. President, of my hearty co-operation in the work.

DR. ADOLPH W. MILLER

said: I left the distant city of St. Paul, Minn., in 1860 for the single purpose of attending the lectures in the Philadelphia College of Pharmacy. It so happened that the very first lecture that I listened to in the old College Building on Filbert Street was delivered by Prof. Wlliam Procter. As has been stated by the previous speakers, his delivery was not by any means fluent or brilliant, but he impressed me very forcibly with the profundity of his learning, with the marvelous amount of care and study that he must have given to the subject under his consideration at that time. I immediately recognized in him the foremost representative of the art and science of pharmacy, as he had previously been represented to me by my former preceptors, so that the first slight disappointment on account of the manner of his delivery was at once effaced.

In subsequent years I frequently had occasion to call on Professor Procter for advice and counsel in scientific matters pertaining to pharmacy, and I invariably was met by him in the most cordial and genial manner. The rich stores of knowledge which he possessed were always at the service of whosoever asked for them, and it

really seemed to give delight to Professor Procter to be of assistance to any one in pursuit of investigations in his domain of study.

I am indeed very glad that Dr. Hancock has taken in hand the erection of a bronze statue to our departed friend, and I most sincerely hope that his project will soon be realized. It occurs to me that no more fitting locality for the placing of this lasting monument could possibly be selected than the vicinity of the Smithsonian Institute in our National Capital, where Professor Procter will stand in close proximity to that other esteemed teacher of mine, the father of American Surgery, the late Prof. Samuel B. Gross, which statue was placed there by the physicians and surgeons of the United States. By placing Professor Procter's statue in his company, we will in a manner emphasize the equal claims with pharmacy and surgery in the esteem of future generations of visitors to the National Capital.

GEORGE M. BERINGER

said: "It was not my privilege to know Prof. William Procter, Jr., as he had passed away before my entrance into the drug business, but I am acquainted with his more than five hundred contributions to the pages of the AMERICAN JOURNAL OF PHARMACY. I fully appreciate the useful and practical nature of many of these contributions and the high ideal of pharmacy which were therein promulgated.

"It appears to me that at least three States have a peculiar interest in perpetuating the memory of Prof. William Procter, Jr.—Maryland, as his birthplace and the State wherein he spent the days of his childhood; Pennsylvania, where he achieved his success and performed his monumental labors in behalf of pharmacy; and New Jersey, wherein he spent a short portion of his declining days, and which State has furnished a final resting-place for his body.

"The New Jersey Pharmaceutical Association, recognizing the propriety of perpetuating his memory, several years ago appointed a committee on Procter Memorial. This committee has been continued, awaiting the crystallization of the various plans suggested into a national movement that might be considered definite and feasible.

"I have no doubt that the movement now inaugurated by the appointment of a committee of the American Pharmaceutical Asso-

ciation, looking toward the establishment of a monument on the grounds of the Smithsonian Institute, at Washington, will receive the co-operation and support of the New Jersey Association."

M. I. WILBERT

spoke as follows: "While I am heartily in favor of the proposed statue, I am not so sanguine of the feasibility of securing the necessary funds at the present time. But whether this is actually accomplished or not, I feel that pharmacists in general, and the members of the Philadelphia College of Pharmacy in particular, owe a debt of gratitude to Mr. Hancock for reviving the memory of William Procter, his ideals, precepts and teachings at a time when all the prevailing tendencies appear to be drifting along commercial lines.

"In this connection I would like to call particular attention to 'An Address to the Pharmacists of the United States,' written by William Procter fifty years ago and published in the volume of the 'Proceedings of the American Pharmaceutical Association' for that year (1854.) Other volumes of the proceedings of this same association, notably those for 1852, 1853 and 1858, also contain contributions along these same lines.

"I wish especially to call attention to what I consider the most important, and in many respects the most appealing, expression by William Procter on the question of professional pharmacy. This is contained in the valedictory address to the class of 1866, when William Procter resigned from the chair of the practice of pharmacy in this college. This valedictory was intended as a farewell not alone to the class of that year, but also to the members of the college and others on his retiring from active life as a teacher, and contains a number of thoughts that are particularly appropriate to present conditions. While Professor Procter did resume the chair of the practice of pharmacy on the death of Professor Parrish, he did not live to again address a graduating class at an annual commencement."

Mr. Wilbert then read the following extract from this address:

"The custody, preservation and preparation of the various medicinal agents demand intelligence and skill, and they in whom the trust is reposed should have received a careful educational training and be animated by higher motives than those which usually rule in trade and commerce.

"Pharmaceutical education, animated by correct moral principles, is the only lasting basis for the reform, yet so sadly needed in the practice of pharmacy. The great tendency of our times is to acquire wealth quickly without labor, or with labor but for a brief period. Any course that opposes this is distasteful. Under the influence of this, even in pharmacy, there is a growing disposition to avoid making costly and troublesome preparations by referring them to the chemist or manufacturing pharmaceutist. Many stores are annually becoming more and more mere dispensaries. The laboratory is fast disappearing as an indispensable appendage to the dispensary, while the mercantile department is proportionately developing and extending. In a word, the apothecary is becoming a merchant, and the value of a clerk is rated by some, less by his scientific skill than by his ability as a salesman.

"In Germany the pharmaceutist is responsible for the quality of the preparations he dispenses. He is bound either to make them himself or by testing them to be assured of their good quality. Let us hope that this rule may some day obtain here and sift out the pretenders who, to so large an extent, enjoy the confidence and patronage of the public. Let us remember that each one of us has a mission in this world, and, having adopted pharmacy, let us do our best with it, infusing the true and right into its rules and processes, and leave it better than we found it to those that succeed us."

JAMES T. SHINN,

having been called upon for some remarks, said: "I remember Professor Procter when he lectured in the college building on Zane Street over the casks of sugar stored in the cellar. Though not a brilliant speaker, he was clear and forceful in style. The quiz was held before each lecture, and I remember when I only knew four out of five answers to his questions. I did not say anything, though he would have kindly helped me out with the last one. Years after he and I canvassed the lower part of the city for contributions to the College Building Fund, and his manner was kind and genial as well as persuasive. He was active in the pharmaceutical meetings, often reading papers of practical interest.

"His memorial has already been erected in the work he has done for our College, the AMERICAN JOURNAL OF PHARMACY and hosts of young men who were privileged to study under him. A monument

of bronze as proposed by Mr. Hancock might perpetuate his memory to future generations, and though his retiring spirit would object to such a public display, and my Quaker training would lead me to disapprove of it, I fear I would be inconsistent enough to subscribe towards its erection."

EVAN T. ELLIS

spoke as follows: "I cannot recall the exact time of my first acquaintance with Professor Procter, being in doubt as to whether it was when he was an apprentice with the dear old-time apothecary, Henry M. Zollickoffer, in the '40's, or soon after he located in his own store at Ninth and Lombard Streets. I rather believe it was the latter (1844). As our own store, through my dear father, was the publication office of the JOURNAL, or rather the business office of the JOURNAL for nearly half a century, it was my fortune to see much of Professor Procter. With his great attainments in the pharmaceutical world, there was one thing that greatly impressed myself and all who were brought in relations with him—his great modesty and retiring nature. When in after years his name had been known and honored not only throughout our own country, but abroad, William Procter, Jr., was the same.

"'Not the applause of listening Senates to command'

could ever have made William Procter, Jr., different from what he was."

EDWIN M. BORING

spoke as follows: "To have Dr. Hancock, who is one of the most popular members of the American Pharmaceutical Association, come here to present the claims for recognition of Professor Procter's services to pharmacy, seems like carrying coal to New Castle, but we must admit that he has done this work well."

It was my privilege to sit under Professor Procter's lectures in the winters of '65 and '66; also to meet him at our pharmaceutical meetings up to the time of his death. His learning, moral worth, sincerity of purpose and great modesty commanded the admiration and respect of all who knew him.

JOHN F. HANCOCK

said: I desire to explain that my address was made as brief as possible that others might have time to discuss the subject.

I had read the views expressed in the journals, recommending various means of honoring the memory of the late Professor Procter.

I was present at the dedication of the bronze monument in commemoration of the American surgeon, the late Professor Samuel D. Gross, of your city, in the Smithsonian grounds at Washington, D. C., and it then occurred to me, that of all the views expressed in favor of memorializing the life work of the American pharmacist, the late Prof. William Procter, Jr., the "monument" would be the most appropriate.

This thought so impressed me at the time that I have become zealous and feel a willingness to work for its consummation.

The research laboratory idea that has been popular with some pharmacists, is to me inadequate.

In the beginning it might be highly creditable, but like some changeable creation of man it may become in the course of time inconsistent with so distinguished a character.

The proposed medals would be too ephemeral and quite insignificant. Being small and easily lost they would soon elude public notice, but the "monument" given over to the custody of the United States Government, in commemoration of him, would be looked after, cared for, and remain a chapter of our Nation's history while our civilization endures.

WILLIAM MCINTYRE

paid the following tribute to the memory of Professor Procter:

The former speakers have in elegant and forcible language told us what a very practical and scientific man William Procter was. Now as a student of his I can bear testimony to his intense interest in us. An incident or two will develop what I mean. At my final examination he exhibited a beautiful porcelain-like specimen of Arsenious Acid and inquired, what is it? I failed to recognize it. A bottle of alcohol was then shown and recognized. After several questions on the subject he said to me—"Be as careful in its use as you would of the Arsenious Acid."

Meeting him a few years later he said: Why you seem to be making the mistake of so many young apothecaries. Continuous attention to the store had impaired my health. He suggested I cultivate the habit of taking a vacation, and recommended the meetings of the American Pharmaceutical Association as being just the right thing. I have reason to be thankful for his good advice.

Feeling that I will express the sentiment of all the ladies and gentlemen present, I now offer a motion—that the thanks of the meeting be given to Dr. John F. Hancock for his address relative to a monument to William Procter.

HENRY A. BORELL

sent the following letter:

I met Prof. William Procter, Jr., a few times in my early apprenticeship; it was on matters of business. I was sent to him, I think, in reference to Pepsin. I was most favorably impressed with his quiet and easy manner, and often afterwards regretted that he no longer was of the teaching faculty of the Philadelphia College of Pharmacy.

THOMAS S. WIEGAND,

when asked to give some of his personal recollections of Professor Procter, said:

I regret my health does not permit me to be out after nightfall, or I should have been most glad to have attended the meeting held last evening and voiced my remembrances of my friend, Prof. William Procter, Jr. My acquaintance with him began about the year 1844 or 1845, and from that time up to the time of his decease our relations were of the most cordial character.

The most prominent trait, and one which made all his friends confide in him so fully, was his perfect frankness and sincerity—always expressing his full opinion and conviction upon any subject he discussed. This always made any one who consulted him on any subject feel sure of good, wholesome, sound advice. To estimate his position in pharmacy, one must consider the changes that have taken place in the business of pharmacy from his active participation in it and its present status.

When Professor Procter entered into business the apothecary was pre-eminently a practical man, a worker in the *art*, a real maker of the materials he supplied to his customers and used in the compounding of prescriptions and the preparations he dispensed; hence he became fitted by his work and his careful habit of observation to give that information which all who knew him so much appreciated, and this fitted him for that place which so many of his confrères have been pleased to bestow on him—the Father of American Pharmacy.

The pages of THE AMERICAN JOURNAL OF PHARMACY will show to those who did not have the great privilege of his personal acquaintance, that by a rough and hasty count of papers in the Index there are over 500 different papers furnished by him, and this it must be remembered was accomplished while the responsibilities of a large retail business were on his shoulders and the lectureship in the College also demanded his personal attention. Papers also contributed to the proceedings of the American Pharmaceutical Association must not be overlooked, and the syllabus of the course of study for pharmaceutical classes, which will ever be a lasting memorial of his clear-sighted view of pharmacy in its relation to the education of those who chose pharmacy for their calling. It has been a frequent source of regret that the writer did not enjoy the great advantages of the courses of lectures given by Professor Procter at the Philadelphia College of Pharmacy.

The present generation of pharmacists have, however, the advantages of being the *elèves* of those who were instructed by Professor Procter, and as these pupils of Professor Procter are and have been in many instances scattered over our country and teachers in many of the colleges of pharmacy it is easily to be seen how very greatly the influence of the Professor's teaching has extended throughout our land.

This short review of his influence, it seems to me, makes it most eminently proper that a fitting memorial to his worth and ability should be erected in some place where the national character of his influence on pharmacy would call the attention of all who visit our country and especially our capital for all time to come.

HENRY CRAMER,

of Germantown, wrote as follows: "I acknowledge receipt of yours of December 9, 1904. Advanced years and continued impaired health forbid my attendance at the Pharmaceutical meeting during evening of December 13th. Regretting inability to be present, I hereby earnestly support the intention to create a monument in memory of Professor Procter, the 'Father of American Pharmacy,' as he is deservingly styled in your call for the meeting.

"Not long after my arrival in Philadelphia—July, 1849—I became acquainted with him. He met me with his well-known kindliness—continual to his last days—I bear him grateful remembrance."

PHARMACEUTICAL MEETINGS.

(NOVEMBER AND DECEMBER.)

The stated Pharmaceutical Meeting of the Philadelphia College of Pharmacy was held on Tuesday afternoon, November 15th, with Howard B. French, President of the College, in the chair.

The first speaker introduced was M. I. Wilbert, Ph.M., who presented a communication on "Progress in Pharmacy," this being a quarterly review of the advances in pharmacy and materia medica. (See this Journal, December, 1904.)

In the discussion following the paper, Mr. Wilbert said that there were some twenty odd names for epinephrin—all trade-marked and each the property of the house applying it. He said that likewise there were almost as many proprietary names for hexamethylene tetramine as cystogen, formin, etc., and although this salt under the true chemical name is cheaper in price than the proprietary articles, these must be dispensed if prescribed. He therefore agreed with the proposition to refer this question to some scientific society, as the American Therapeutical Association, to see whether these products are identical in solubility, therapeutic action, etc., and to correlate the results and select one common name for them.

Dr. C. B. Lowe was of the opinion that manufacturers would object to such a proceeding, each one claiming superiority for his product.

George M. Beringer thought that in the case of pharmacopœial articles it might be safer to say that the proprietary articles are said to be the same as those in the Pharmacopœia.

The therapeutic properties of epinephrin having been alluded to by Dr. Lowe, Wallace Procter said that he was inclined to believe that when this substance came to be more definitely known it would be treated in much the same way as pepsin is at present. He said that pepsin is now recognized by the Pharmacopœia and that manufacturers vie with one another to come up to the official standard, and that while there are a good many commercial kinds an effort is made to make them correspond to the U.S.P. requirements.

President French next called attention to the historical scientific exhibit to be held shortly in London by Henry S. Wellcome, and stated that Mr. Wellcome desired the loan of historical objects

illustrating the development of the art and science of healing throughout the ages, and that he would have the articles insured while in his possession and en route, if desired, and also pay for their transportation both ways.

Dr. Lowe spoke of Mr. Wellcome's interest in scientific matters and referred to his explorations in South America to determine whether the Indians or the Spanish were the first to use Cinchona as a medicine.

George M. Beringer, A.M., presented a paper entitled, "A Record of Several Toxicological Investigations," and exhibited in connection therewith the specimens that had been prepared for the trials referred to in his paper. The paper will be published in a later issue of this Journal.

In prefacing his remarks, Mr. Beringer said, it must not be supposed that in toxicological examinations of the kind recorded the work can be entirely carried out according to the books, but that each case is a law unto itself.

In commenting upon the fact that no inflammation of the walls of the stomach was noted in the arsenic poisoning case referred to by Mr. Beringer, Dr. John Marshall said that when arsenic is administered in the form of arsenite no inflammation o the membrane o the stomach takes place, as the poison is so quickly absorbed; but, on the other hand, there is no case on record of administration of the oxide in which inflammation does not take place.

Dr. S. Solis Cohen, Professor of Clinical Medicine in Jefferson Medical College, gave an address on "The Proper Scope of Scientific (so-called Expert) Testimony in Trials involving Pharmacological Questions," an abstract of which follows (see also page 1):

Physicians and pharmacists called upon to testify in court should not permit themselves to be placed, even apparently, in the position of partisans. They should by the directness, simplicity, completeness and frankness of their answers to both sides, show their sincerity and truthfulness. The scientific or expert advocate has a legitimate place in court, but it is by the side of counsel, not in the witness box. The two functions should not be united.

The function of a scientific witness is to enlighten the judge and jury as to the significance of certain facts and relations beyond the ordinary knowledge, but of which he has made a special study. His testimony must be based in part upon his reading, in part upon his

observation. To exclude as hearsay that which is based upon reading—even when it can be discriminated—might exclude testimony as to the homicidal and suicidal tendencies of maniacs if one had never actually seen a maniacal killing, as well as testimony as to the possibility of death from strychnin, if one had never actually seen a person die from such cause, or as to the presence of arsenic in a normal thyroid gland if one had not made a personal analysis.

Expert witnesses concerning pharmacologic questions are called upon to give four different orders of testimony not usually discriminated. They are all treated as matters of opinion, but in reality three relate to matters of fact. (1) Personal observations on the part of the witness as to the effect of drugs on the human or animal body are judgments of fact. They may be mistaken judgments, as may also be the judgment of a surveyor as to the location or dimension of a certain plot of ground, but both judgments are of the same order; they both depend on the interpretation of data observed by special methods. They differ from ordinary judgments of fact and from each other, not in kind, but in degree of complexity. (2) The methods of chemical analysis and their results are obviously matters of fact. The conclusions based thereon are judgments of fact as in the case first cited. That arsenic has or has not been found in a given case is not a matter of opinion, but one of fact. It is to be criticised from that standpoint. If the methods pursued have been faulty, or if the results have been inconclusive, that can properly be shown, but also as matters of fact. (3) Matters of general scientific knowledge, *e. g.*, as to the action of drugs, or the contamination of foods, drugs and manufactured articles of various kinds by poisons, or as to chemical and pharmaceutic incompatibilities, and so forth, are also matters of fact, whether within or without the personal observation of the witness. Concerning matters, however, which are not only outside the observation of the witness, but beyond the usual range of his studies, he can only have an opinion. He cannot know them as facts, and he should refuse to testify concerning them. (4) When the witness has made no personal observation, and is called upon to form judgment upon data which consist of the descriptions and judgments of others bearing upon a particular case, he cannot know the facts, and he cannot give testimony; he can only express an opinion. The fact that the opinion is expressed in court and under oath does not alter its character. It is purely

subjective, and represents the state of mind of the witness and nothing else. As such it will have weight with judge and jury according to the estimate they make as to the fitness and capacity of the witness to form opinions upon facts of the order submitted. One great difficulty arises from the necessity to avoid technical terminology in matters that cannot be made entirely clear without it, but the slighting opinion often expressed or intimated as to the value or sincerity of medical and pharmaceutic expert testimony is but partly due to this or to the obscurity of the question concerning which they testify. It is in part to be attributed to the willingness of experts to combine the discordant functions of advocate and witness; in part to the fact that experts do not use sufficient care in framing their answers to avoid the appearance of giving a positive judgment when the facts are insufficient for positiveness; in part to the fact that experts permit themselves to answer questions that can have no object but to confuse the minds of the jury; questions that are not relevant, questions that are simply captious criticism of unimportant details of the testimony of others, or questions that twist absence of knowledge into knowledge of absence. The expert should distort nothing, magnify nothing, minimize nothing; assert as positive nothing doubtful, throw doubt upon nothing certain; introduce nothing irrelevant, suppress nothing material. He should say nothing that he would be unwilling to defend before a learned society; he should be as frank upon cross-examination as upon direct examination; his efforts should be bent to elucidate truth, and not to score points for or against either side. The court should restrict examinations to matters having actual bearing upon the cause at trial, but the testimony of the expert should be given only with reference to scientific accuracy, and not with reference to its effect upon the verdict.

Among those taking part in the discussion of the address were Dr. Lowe, President French, Mr. Wilbert, Dr. Marshall, and Mr. Beringer.

Referring to the effects of the metallic poisons, Mr. French said that in an experience of sixty odd years the firm with which he is connected, namely Samuel H. French & Co., paint manufacturers, had never had a case of lead poisoning, and this he attributed to the fact that the workers in dry lead are advised to use olive oil freely with their food. He said that his firm had recommended this precaution to lead manufacturers throughout the United States.

In considering the question of expert testimony, Mr. Wilbert said that he had found that one way of keeping out of court was to insist on telling the truth.

Dr. Marshall said that Dr. Cohen had made a very clear statement of affairs here, but fortunately it did not apply to countries abroad, as there the experts are selected by the state. He said that it was un ortunate that in this country people sometimes testi y as experts who are not qualified to do so, and in this connection he related an instance of a man making a pathological examination who was not a toxicologist at all, and said that his testimony might be taken as equal to that of the most eminent toxicologist. On the other hand, he said that in this day it was impossible to know all the sciences, and in a toxicological examination a chemist might be sneered at because it was his first case, and yet be able to make a correct analysis.

Mr. Beringer said that attorneys often interfere with experts by not allowing them to explain their answers, insisting instead that they answer simply categorically yes and no.

Dr. Marshall referred to the danger of publishing as positive deductions the results of incomplete and unconfirmed investigation, and cited that several years ago a young student in one of the Universities had published a paper, in which he stated that it "was impossible to recover administered strychnine in the intestines, claiming that it was destroyed in the alimentary canal." This damaging and erroneous statement had been given wide circulation. The fault was that the student had not adopted a method that would isolate the alkaloid, and on subsequently repeating the work by another method suggested to him by Dr. Marshall he had successfully separated the strychnine and had been compelled to publish a correction of his first paper.

In this connection Mr. Beringer exhibited a specimen of alkaloid strychnine, recovered from a portion of the intestines in the Woodward case, recorded by Dr. Marshall in *American Medicine*, June 18, 1904.

On motion of William McIntyre a special vote of thanks was tendered Dr. Cohen, for his able and interesting address.

FLORENCE YAPLE, *Secretary pro tem.*

It having been the desire of some of the members to hold a few of the Pharmaceutical Meetings in the evening, the third of the

present series was held on Tuesday evening, December 13th. The president of the College, Howard B. French, presided.

The principal speaker of the evening was Dr. John F. Hancock, of Baltimore, who gave an address on "William Procter, Jr., the Father of American Pharmacy." (See page 13.) Dr. Hancock was president of the American Pharmaceutical Association, at the Richmond meeting in 1873, and is one of its most esteemed members. He was a personal friend of Professor Procter and has for some years past been actively identified with the movement to memorialize the life and work of Professor Procter. Largely through his efforts the Association, at its last meeting, in Kansas City, adopted a resolution favoring the erection of a monument in the Smithsonian grounds in Washington City in honor of Professor Procter. President James H. Beal, of the Association, has appointed the following committee to carry on the work, of which Dr. Hancock is chairman: Benjamin T. Fairchild, New York City; Frank C. Henry, Washington, D. C.; C. S. N. Hallberg, Chicago; Henry Kraemer, Philadelphia.

Dr. Hancock's address was enthusiastically indorsed by the members present, and among those who spoke (see page 35) were President French, Professor Remington, James T. Shinn, Dr. A. W. Miller, Evan T. Ellis, E. M. Boring, William McIntyre, M. I. Wilbert, and George M. Beringer. Letters regretting their inability to be present were received from the following: Benjamin T. Fairchild, Frank C. Henry, J. H. Redsecker, Joseph Crawford, Wm. J. Miller, Henry A. Borell, H. Cramer, and Mahlon N. Kline.

M. I. Wilbert, Ph.M., read an interesting paper on "Dr. Christopher Witt—An early American Botanist and a man of many and varied attainments," which was illustrated by a number of lantern slides. This paper will be published in a later issue of this JOURNAL.

At the next meeting, which will be held Tuesday evening, January 10th, the following papers will be presented:

"A brief consideration of a few facts determining the Relationship between the Science and Art of Pharmacy and the Science and Art of Medicine." By Dr. Henry Beates, Jr.

"The Pharmacist and the Physician." By M. I. Wilbert, Ph.M.

There will also be communications from Prof. William Osler, Baltimore; Prof. John H. Musser, Philadelphia; and others.

"The Size of the Dropper as applied to Alkaloids in Eye Drops." By Dr. P. N. K. Schwenk.

HENRY KRAEMER, *Secretary.*

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A BRIEF CONSIDERATION OF A FEW FACTS DETERMINING THE RELATIONSHIP BETWEEN THE SCIENCE AND ART OF PHARMACY AND THE SCIENCE AND ART OF MEDICINE.

By Henry Beates, Jr., M.D.

℞	Aconitiæ Cryst. Merck	Gr. 1–20.
	Resinæ Phosphori, 4 per cent	Gr. v.
	Calcii Phosphatis	Gr. xlviii.

Misce et fiant capsulas numeros quatuor et viginti.

Signa.—One every two hours for four or five doses, then one every four hours, constitutes an "instrument" which is exponent of many *facts* associated with life and the profoundest interests of human existence.

The prescription is designated "an instrument" because of its legal significance, for it is a "writing acknowledging or certifying to a claim, or recording the terms of a contract, deed or grant," and by common consent presupposes a right, by reason of the possession of qualification, to formulate and to have compounded and administered, without harm, according to obtaining conditions.

It is evidence, and should be proof, of the possession of a reasonable degree of mastery of those sciences and their art, common in large measure to the professions of pharmacy and medicine, and is the common ground upon which we meet, under conditions of a *naturally* founded relationship.

Our respective professions are effects of antecedent causes, and in a wider signification the evolution of humanity. They are facts of being, and in importance occupy the highest place.

For the discharge of the responsible functions attaching the professions of pharmacy and medicine, a degree of scholarly skill and attainment is requisite, which is, unfortunately, too commonly found

to be wanting, and, happily, in this period of human progress, beginning to engage the serious attention and partial supervision of Government.

Control, therefore, of the conferred right to formulate a prescription, to compound the same, and to superintend its use, discovers two professions, related by many similar conditions, which for their observance and requirements demand co-operation, if their normal growth and development and consequent usefulness is to be vouchsafed, and mankind to profit from their inherent utilitarianism.

A fellow-being is stricken with some illness, or is the victim of an accident or deformity that impairs his usefulness, which, in addition to inflicting discomfort and suffering, seriously interferes with the exercise of those functions which secure the necessities not only of his own but dependent lives.

The sciences and art of pharmacy and medicine are his principal means of relief—his almost only hope for restoration. Can anything be of greater value under such sore affliction? Can anything demand so important a degree of qualification to cope with the involved complex and profound problems as the professions we represent?

A word as to the science feature of our professions:

Medicines are derived from the vegetable and mineral world, and the specific use of the forces is also to be included in the term. This fact renders it necessary that a knowledge of those principles which affect the functions of the human economy, be possessed by some characteristic group of mankind.

Of the vegetal origin of remedial agents, for illustration, it must be known at what period of the growth of an herb, tree or what not, its medicinal active principles are most advantageously obtained; also what these are, and whether to be extracted from the root, rhizome, bulb, stem, bark, leaves or fruit, and how.

Separation of the various active principles, so commonly existing in a given vegetal organism, is essential, especially as one or more possess properties which, when administered to the human being, frequently exert diverse and even antagonistic influences.

Again, the season or time of year at which the various plants, etc., possess these principles, in their fulness, must be known—a science of no mean value, and essential for the best achievements of pharmacy and medicine.

How to extract these principles demands a mastery of the science of chemistry, so self-evident that it is needless to more than give it mention. The magnitude thereof speaks for itself; its requirements are self-evident; but that the mastery of chemistry, as applied to pharmacy, in contradistinction to the mastery of chemistry as applied to medicine, constitutes practically an especial study and pursuit, cannot be too strongly emphasized, and the one cannot be substituted for the other.

That these two phases of chemistry do, however, possess some features in common, as is illustrated in incompatibility in unscientifically formulated prescriptions, goes without saying. Yet this constitutes an entirely different question, and should not prevail, except for lack of proper qualification.

To be brief, a knowledge of the inherent properties possessed by remedial agents includes their physical, chemical and physiologic potentials. The two former belong to the pharmacist, and the latter, in an especial sense, to the physician.

This fact cannot be too clearly appreciated and comprehended, and may be emphasized by stating that the science of pharmacy requires a mastery of botany, including the anatomy and physiology of plant life, as well as of chemistry in a specific sense.

The technical phases include the ability to recognize both the macroscopic and microscopic characteristics of the medicinal plant world, the proper methods of obtaining active principles, and preparing the various tinctures, infusions, extracts, alkaloids, glucosides, etc., and to be able to know that these products are of an approximately standard strength and value. In a more special sense, a pharmacist must be skilled in the art of properly compounding a *correctly formulated prescription*, which latter, it is stated with regret, is not as uniformly written as the qualification rightfully expected from the medical profession should supply.

The preparation, and, what is equally important, the means of preserving, unaltered, the inherent potentialities of remedies, also belongs to the domain of pharmacy. The same general principles or facts are applicable to the remedial agents obtained from the mineral world.

Science and art, therefore, in their highest significance, characterize pharmacy, and demand of its followers a high standard of scholarly attainment and an equally exalted degree of skill.

The science and art of medicine demands a mastery of the sciences of biology, anatomy, physiology, chemistry and pathology. The natural course of disease, injury, and the consequences of deformity, comprise a phase of medicine not here necessary to be elaborated, but, QUALIFICATION, in the broad sense, to as successfully as possible restore to a common equilibrium, these manifold afflictions, is pre-eminently the high function and weighty responsibility of medicine.

In a word, pharmacognosy constitutes the truly science side of the profession of pharmacy. Its profundity and scope, and the possession of its practical *qualifications, its art,* can only belong to those learned followers who devote their entire talents to its demands. It is impossible for a physician to possess himself of the specific ability belonging to the science and art of pharmacy, just as it is alike impossible for a pharmacist to acquire the specific ability of the physician. Thus is distinctly seen the *individuality,* so to speak, of the respective professions, also their mutual interdependence.

To repeat, in the prescription are embodied the points of contact and parallel action establishing that common relationship which constitutes a bond of union between the sciences of pharmacy and medicine and their art, without which neither can achieve the common good for mankind which should be a certainty.

The prescription *is evidence and proof of professional qualification.* Its formulation attests the ability of the physician; its compounding that of the pharmacist. 'Tis the crystalline product of the two professions, and is proof of the existence of that relationship which is the inevitable resultant of these two great callings of life.

What, therefore, if these expressed generalizations be true, can be achieved, if there is not throughly established, upon a practical basis, that inherently essential relationship between pharmacy and medicine, which *natural law determines?*

There must be *qualification* on the part of each. *This implies a higher standard of education than has hitherto obtained!* Pharmacy and medicine demand a higher degree of scholarship, for without it the possibilities of each cannot be hoped for.

This fact is perhaps best demonstrated by the prescription as it is usually discovered. That the prescription is distressingly empirical does not need demonstration. This criticism does not include what, for self-evident reasons at the present, is to be regarded as normally so, but what is, from the point of view of *qualification,* inexcusably prevalent.

Too frequently are physical, chemical and physiological incompatibilities contained in even one prescription, and this means the defeat of the very purposes intended. It emasculates medicine of its intrinsic value, and supplies to suffering humanity a false trust; it robs pharmacy of its science and art!

The sum total of results of such deplorable incompetence are the growth and development of a like valueless group of "pathies," the prescribing of all sorts of *worse than useless compounds and mixtures*—the annihilation of the art of therapeutics, seriously endangering both, and the belittlement of pharmacy and the growth and thriving of a debased commercialism, which bids fair to prolong the inadequateness of pharmacy and medicine to benefit mankind, as their created and inherent powers enable them to do, where qualification is a *sine quâ non* for its followers.

To correct this malignant defect demands intelligent co-operation on the part of each by each. The students entering the respective callings, from the present on, must be individuals of a broader training and higher education; their study and teaching and training must be of a standard yet to be established! *A rational curriculum* for each is to be founded and administered to the full, with an eye single to the magnitude of the interests involved, for the enormity of the attaching responsibilities, and for the greatest good of fellowman.

When such will have been achieved, the proper relation between the sciences and art of pharmacy and medicine will be established, and mankind profit, and be made secure against his greatest enemy—disease, deformity and injury.

Sociologic evolution finds pharmacy and medicine regulated by Boards of Examiners. Their establishment here encountered bitter opposition, and their operation much adverse criticism, and while glaring defects characterize these, efforts to perfect and not to belittle should prevail.

The existence of statutory control of the practice of pharmacy and medicine is proof of a commercial degeneracy from the highest standard of proficiency to low and dangerous practices by ignorant and incompetent practitioners of both.

The welfare of the people demands protection against the evil consequences of incompetent pharmacy and medicine, and a too firmly entrenched and unprincipled commercialism still commands

too much sympathy and advocacy on the part of the public, when efforts at correction are aggressively active.

There is, however, one grand principle ever potent in encouraging and supporting the inevitable progress crowning the efforts for standardization—it is law, and that the respective professions may be better acquainted with their rights and privileges to apply this power to their duties of higher citizenship, the following quotation will be presented :

(*From U. S. Supreme Court Reports for 1888, Opinion of Chief Justice Field,*) (*affirmed by the unanimous opinion of the Court!*)

"It is undoubtedly the right of every citizen of the United States to follow any lawful calling, business or profession he may choose, subject only to such restrictions as are imposed upon all persons of like age, sex and condition.

"This right may in many respects be considered a distinguishing feature of our republican institutions. Here all vocations are open to every one on like conditions. All may be pursued as sources of livelihood, some requiring *years of study and great learning* for their *successful* prosecution.

"The interest, or as it is sometimes termed, the estate acquired in them, that is, the right to continue their prosecution, is often of great value to the possessors, and cannot be arbitrarily taken away from them any more than their real or personal property can thus be taken.

"But there is no arbitrary deprivation of such right where its exercise is not permitted because of a failure to comply with conditions imposed by the State for the protection of society.

"The power of the State to provide for the general welfare of its people authorizes it to prescribe all such regulations as, in its judgment, will secure or tend to secure them *against the consequences of ignorance and incapacity, as well as of deception and fraud.*

"As one means to this end, it has been the practice of different States from time immemorial to exact in many pursuits a certain degree of skill or learning upon which the community may confidently rely, their possession being generally ascertained upon an examination of the parties by competent persons, or inferred from a certificate to them in the form of a diploma or license from an institution established for instruction on the subjects, scientific and otherwise, with which such pursuits have to deal.

"The nature and extent of the qualifications required must depend primarily upon the judgment of the State as to their necessity. If they are appropriate to the calling or profession, and attainable by reasonable study or application, no objection to their validity can be raised because of their stringency or difficulty. It is only when they have no relation to such calling or profession, or are unattainable by such reasonable study or application, that they can operate to deprive one of his right to pursue a lawful vocation.

"Few professions require more careful preparation by one who seeks to enter it than that of medicine. It has to deal with all those subtle influences upon which health and life depend, and requires not only a knowledge of the properties o vegetable and mineral substances, but of the human body in all its complicated parts, and their relations to each other, as well as their influence upon the mind.

"The physician must be able to detect readily the presence of disease, and prescribe appropriate remedies for its removal. Every one may have occasion to consult him, but comparatively few can judge of his qualifications of learning and skill.

"Reliance must be placed upon the assurance given by his license, issued by an authority competent to judge in that respect, that he possesses the requisite qualification. Due consideration, therefore, for the protection of society may well induce the State to exclude from practice those who have not such a license, or are found upon examination to not be fully qualified."

The same principle is as forceful and just in its application to pharmacy as it is to medicine.

Another feature, and your time will not be further occupied. As man's interests are so closely related to our respective professions, we find ourselves responsible for what Marshall O. Leighton, in the *Popular Science Monthly* for June, 1902, treats under the title, "The Commercial Value of Human Life."

Four of his conclusions are presented:

(1) The pecuniary value of life is subject to the same economic laws as are applied to the more vulgar commodities.

(2) In the courts of law the measure of an individual's productiveness, which is the measure of his value, receives the most careful scrutiny; therefore, the decisions of such courts, where existing statutes permit, are trustworthy in determining an individual's value to his family.

(3) The pecuniary value of a life to its relatives represents its pecuniary value to society.

(4) Damages given for wrongful death are such that they can be represented by an average in different groups of age, with only narrow limits of probable error.

These features of man's general relationship are indissolubly associated with the proficiency of the professions we represent, and it is our province to see to it that Ph.G. and M.D. constitute a *reality* when man's greatest interests, because of affliction, are intrusted to our *qualification* to serve him conscientiously and well, and thus to be beyond the possibility of a liability due to incompetency or neglect.

'Tis only the unprincipled and commercially degenerate, *misrepresenting our two grand and noble professions*, who, in addition to prescribing quack nostrums, and all sorts of mixtures, compounds, etc., offer objection and opposition to higher standardization. All such, whether individual or institutional, should be well known and accorded the full measure of their merits.

AN IRREMOVABLE STIGMA.

Our duty is plain—let us each, fearlessly and actively, co-operate in establishing those conditions which, other things being equal, will achieve the desirable end, and find the follower of pharmacy and medicine meriting that confidence and respect on the part of fellow-men, which his conscientious discharge of duties, character and honor command!

A TENDENCY IN MEDICINE AND ITS INFLUENCE ON PHARMACY.

By John H. Musser.

In speaking of the relation of the science and art of medicine to the science and art of pharmacy, one must reflect upon the status of medicine in coming years. From the indications of to-day, just as the present compares with twenty years ago, one can see less and less of the use of drugs and more and more of measures. Twenty years hence, one can conceive of almost a minimum of drugs. Just recently a paper by Northrup, of New York, forcibly put the value

of fresh air and the proper use of water in the treatment of broncho-pneumonia.

In a very severe case of this grave disease in a child, fresh air, proper feeding and bathing and good nursing constituted the whole scheme of treatment. So in many infectious diseases, and their number will increase, the antitoxins and other scientifically precise measures will be employed. Is not the dictum for the treatment of tuberculosis, rest, fresh air, food, a war cry against drugs? So in local diseases, as those of the abdomen, we do not treat the belly pain, but we find the cause, and in a large percentage of cases the surgeon does the rest. In stomach disorders, in pulmonary, brain and other diseases, surgery plays a large part. In short, we have learned not to be afraid of air, not to be afraid of water, not to be afraid of food wisely directed.

Then see what is coming out of physics, in light-treatment, the X-rays and wonders yet to be disclosed. From organic extracts we are getting a most brilliant therapeutic future.

Moreover, the multiplicity of hospitals, the advent of water cures, etc., will change the status of pharmacy.

We must recall the exact meaning of profession, and whether it is possible that the science of pharmacy can be a profession, or even if desirable to place it in such class. A member of a profession is one who has something to give to those whether rich or poor which cannot be estmated in pounds and ounces or pints and quarts. Moreover, self is not presumed to be considered in the dispensation of his gifts, and to whomsoever that cometh the utmost shall be given. Is it practical that the science of pharmacy should build on such lines?

Indeed, as the medical profession, and it is true of law in part, and I take it of the ministerial profession, in these modern days, in the process of our evolution, the old view does not so well obtain, and I hold it is better for medicine that it does not. The various quicksands and pitfalls that attend the prosecution of our art are better guarded against by the close prosecution of our duties as a science.

I have urged that the pursuit of medicine is conducted from this standpoint and for these brief reasons. Science is truth, and the pursuit of science is the pursuit of truth. Association with truth, an acceptance alone of truth, the search for truth begets character. It is character that stands for men, and, therefore, whatsoever pur-

suit has in it men of character, little need be said among themselves of ethics. There is no surer way of men learning the force of the Golden Rule than in the drill which obtains in the pursuit of science. The man of science learns and acts on Emerson's creed—"whatsoever a man does to his neighbor, whether for good or evil, he does unto himself."

I plead, therefore, that you make the calling of pharmacy not a profession, but a science, and that you insist its conduct must be on the highest scientific planes to the end that those who are its devotees may be counted upon, in season and out of season, as men having no code and no regulations, breathing only the spirit of "doing unto others as you would be done by."

THE PHARMACIST AND THE PHYSICIAN: A NEW ASPECT OF THE CASE.

By M. I. Wilbert,
Apothecary at the German Hospital, Philadelphia.

Some of the articles that have recently appeared in medical, as well as in pharmaceutical, journals would appear to indicate that the relations existing between pharmacists and physicians are in an unsatisfactory and altogether unsettled condition. While it is true that the subject-matter under discussion is not new, and that many of the questions that are now involved have arisen over and over again for upwards of a century, some recent developments in connection with the trade in nostrums, or patent medicines, have added a tone of bitterness to the controversy that will not tend to bring about more amicable relations in the near future.

Unfortunately, too, there is, in nearly all of the printed articles, an evident tendency to hold up the shortcomings and frailties of a few as an evidence of the tendency and ideals of all. That there are members in both professions who do not live up to the prescribed principles or codes of ethics, and whose technical training or skill does not compare favorably with the best that is attainable, all must admit. But to say, on the other hand, that all of the members of these respective callings are guility of any or all of the accusations that have recently been made would be overstepping the bounds of truth very materially. Over and above the evident falsity of any series of general accusations, we should always remember that

crimination or recrimination will not, and cannot, of itself bring other than discredit to all concerned.

It will be much more in keeping with a genuine desire for progress, therefore, if we as pharmacists, recognizing the shortcomings of physicians, also recognize our own, and honestly strive to correct existing abuses by the gradual elimination of objectionable practices.

In the following pages I have tried to outline what I consider the underlying causes of many of the present differences of opinion, and also to indicate the position that I believe pharmacy will hold in the future. In addition to this I have attempted to indicate how we as individuals can, now and in the near future, contribute very materially to bring about a better understanding between pharmacists and physicians, and incidentally contribute no little to a better knowledge of drugs and medicines on the part of future graduates in medicine.

The retail pharmacist of to-day occupies rather an anomalous position, being, or attempting to be, a conglomerate of small tradesman, artisan and member of a liberal profession. In this varied calling he has acquired interests which are at least partially, if not wholly, antagonistic to each other, and which have certainly tended to keep him within distinctly narrow bounds. As a professional man he has not developed as rapidly as was confidently asserted he would half a century or more ago. Among the reasons for this lack of development may be mentioned, that as a whole he has become too numerous, and that the system of education which has been provided for him has proven itself inadequate to develop the principles necessary for the evolution and growth of a professional spirit.

It should be mentioned, however, that despite the meagre training of the earlier apothecaries, or "pharmaceutists" as they were sometimes called, American pharmacy has contributed no little to the sum total of our knowledge of drugs and medicines. Such men as Procter, Parrish and Bedford, although restricted almost entirely to the limited educational facilities of the pharmaceutical schools of their day, have accomplished work that we and future generations of pharmacists may point to with pride.

It has been frequently predicted, and for apparent good reasons, that in the future economic arrangement there will be no need and no place for the retail druggist of to-day or of yesterday. Be that

as it may, so far as the purely commercial interests of the retail druggists are concerned, there can be no question regarding the necessity and consequent continuance of the professional pharmacist. With the constant increase of specialization in the practice of medicine, and the accompanying realization that the human body is not a machine and that its ills cannot well be treated on general principles, there must be an accompanying increase in appreciation of the competent pharmacist, who is willing and able to act as an assistant or adjunct to the medical practitioner. While it is true that the future pharmacist will not be as numerous as he is at the present time, he will occupy a relatively higher position in the social scale, and will in addition be in a position to accomplish much that will make him honored and respected at home and abroad.

For us as pharmacists it would appear imperative, then, that we bear this possible development along professional lines in mind, and see that the proper material is available when the expected change is brought about. The proper foundation for this rational development of professional pharmacy can be laid at the present time, and, in addition to this, we may aid in the pharmaceutical education of future physicians if we can, by any means at our command, improve the present status of hospital pharmacy in the United States. In the education of future generations of physicians, hospital training will necessarily play a most important part. Even at the present time a medical education that does not include at least some hospital experience is considered inadequate. This being true, it becomes evident at once that the impressions a recent graduate receives during his hospital experience—impressions of drugs and druggists—must be lasting ones, and ones that will largely control his future ideas and practices.

How wofully deficient and unsatisfactory the drug service in many of our hospitals must be, becomes evident when we realize that in this great country, with hundreds of institutions to supply them, we have had but one solitary instance of a hospital pharmacist who has become widely known through his professional and scientific work. I refer to the late Charles Rice, of Bellevue Hospital, New York, who, I am sorry to add, was himself a foreigner by birth and early training. Compared to what has been accomplished by the pharmacists of European hospitals, particularly by those of France, this is indeed a poor showing. Much of this deficiency of the past, how-

ever, could be corrected in the future if members of this Association, who are influential in their communities, will direct the attention of hospital authorities to their shortcomings in this respect.

One of the most widespread abuses in hospital and dispensary practice is due to the fact that, apart from a rather limited number of routine stock mixtures, the medicines dispensed consist largely of proprietary preparations that have been donated by charitable manufacturers with a view to having them brought to the attention of the medical men connected with the institution, and, if possible, securing from them suitable endorsements for publication. It need not surprise us, therefore, that physicians who have had hospital experience are frequently more hopelessly dependent on the use of proprietary remedies than graduates who have not had the so-called advantages of a hospital training. Much of this could and would be changed, if hospitals, particularly the larger and more influential institutions, were to employ competent pharmacists who could secure and hold the confidence of the visiting as well as of the resident staff of physicians, and who could and would be consulted on the probable standing of new remedies.

This brings us to a consideration of the intellectual needs and wants of men capable of holding such positions. If the hospital pharmacist of to-day, or the professional pharmacist of to-morrow, is to have and to hold the confidence of medical practitioners, he must be at least the equal of the medical man in education, in ideas and in ideals—so much so that with the increase in the requirements made of medical students there must be a corresponding increase in the demands that are made on the general information possessed by the future pharmacist. He must be a well-educated, thoroughly scientific and altogether capable man, well versed in all the branches of knowledge connected with his own profession, and gifted with a breadth of view that will readily place him above the average of his fellow-men. In return for his knowledge and acquirements he must not expect to be eminently successful from a monetary point of view, but he will be assured of a comfortable existence and the opportunity of doing considerable original work that may in turn revert to the material advantage of himself and his fellow-workers in the same field.

Those of us, however, who have not had the educational advantages that must be provided for the men of the future, and who

probably feel that we cannot aspire to fit in exactly with the demands that will be made of the coming professional pharmacist, can, in the meantime, conduct ourselves and our business in such a way that we will gain the trust and confidence of physicians of to-day, and in this way establish a precedent that will be of incalculable value to our more professional and scientifically more able successors of to-morrow. (*Proc. A. Ph. A.*, 1904.)

ON THE EVIDENT NEED OF A PROFESSION OF PHARMACY.

By M. I. Wilbert,
Apothecary at the German Hospital, Philadelphia.

The notes embodied in this paper are composed almost entirely of references to papers published in medical journals, or of extracts from personal letters received from medical men, who are more or less interested in the subject matter under discussion. Altogether, the paper may be considered a sequel to, or, perhaps better, a continuation of, the paper entitled, "The Pharmacist and the Physician," presented by me at the Kansas City meeting of the American Pharmaceutical Association (see page 60).

The views expressed in that paper have led to an extensive and somewhat varied exchange of opinion on the need of having or developing a profession of pharmacy, the members of which would serve not alone as purveyors of medicines and medicinal preparations, but would also assume, in a way, the position of mentors or advisors on the origin, value and probable uses of the several medicinal preparations offered to the medical profession.

Among pharmacists themselves there appears to be a considerable difference of opinion as to the need or desirability of conducting themselves, or their business, along professional lines. Many appear to hold, with a recent writer in the *American Druggist*,[1] that pharmacy is neither a profession nor the semblance of a profession.

On the other hand we have those who appear to believe that pharmacy has, even now, achieved a desirable degree of perfection, from a professional point of view, and that, therefore, they and other members of their calling should undoubtedly be considered professional men. Again there are others who assert that the pres-

ent state of the art, science or business of pharmacy does not come up to their ideal of a profession, but who also believe that there is a need of such a profession, which, if not supplied by the pharmacists now existing, will ultimately be developed as a distinct specialty of the science of medicine, under the direct supervision of medical practitioners themselves.

Among physicians, particularly such as appreciate the necessity of an ethical development of their own profession, there is absolutely no difference of opinion as to the desirability and the need of a profession of pharmacy, providing the members of that profession be imbued with high ideals and would be willing to subject themselves to restrictions similar to those that restrain and guide the present-day medical men of the better class.

That the present conditions in the business or art of pharmacy are not, in any way, compatible with professional ideas is evident from even a cursory perusal of the reading pages of medical journals. Any pharmacist who will read the editorial on "The Degradation of the Drug Store" in *American Medicine*,[2] or the more recently published article on "Ethical Pharmacy," by Dr. A. L. Benedict, in the same journal,[3] must admit that the conditions as depicted in these articles actually do exist, and that they can in no way be brought in harmony with the necessary ideals of a profession.

The assertion made by one writer that even good druggists make careless and unnecessary mistakes, and the nature of these mistakes, as enumerated by the same writer,[4] are in every way to be deplored. Accidents of this kind are, perhaps, to be condoned, however, on the plea that the prescriptions were not sufficiently legible or explicit. This same excuse cannot be brought to bear on the frequently made and ofttimes repeated accusation of deliberate and malicious substitution.

This accusation has been and is being made so frequently that it has attracted the attention of all classes of medical as well as lay journals. The *New York Times*, in an editorial recently quoted by *American Medicine*,[5] suggests that radical measures are needed to redeem the drug business from the low estate into which it has fallen, and adds that unless druggists themselves awaken to the necessity of exposing unprincipled and dishonest members of their calling, they will be attacked from the outside in sledgehammer fashion.

There is one, recently published, article on this particular subject that should receive more than passing notice. This is the paper on "The Relation of the Physician to Proprietary Remedies—How may substitution be avoided and the desired remedy obtained without unduly advertising the manufacturer?" by Dr. William J. Robinson, of New York, read at the meeting of The American Medical Association, at Atlantic City.[6]

In this paper Dr. Robinson unequivocally asserts that substitution is extensively practised, and, as a possible remedy, unhesitatingly recommends that physicians choose what he considers the lesser evil, by prescribing for original packages of galenical preparations; despite the fact that they are running the risk of having these preparations used indefinitely, as household remedies, by the patient and his friends.

While pharmacists will, no doubt, feel that there is much in this paper by Dr. Robinson from which they might reasonably differ, there is also much, more than appears on the surface, that must necessarily reflect discredit on the present-day practice of pharmacy. Is it, for instance, not true that the dozens, scores and even hundreds of questionable proprietary preparations on the market at the present time are made and sold by so-called reputable pharmacists, or people who pose as pharmacists? And even further, is it not true that the composition of many of these preparations is kept secret, and that, in connection with many of these secret, or semi-secret, preparations claims and statements are made that are misleading, if not positively untrue? And still further, it may be asked, how much of this direct or implied deception have pharmacists honestly striven to correct, knowing all the while, as they should know, that the preservation of the health, happiness, and even the lives of human beings, was at stake.

If we consider carefully the several lines of thought suggested here, we will probably come to the conclusion that, after all, pharmacists are, as a whole, less sinned against than sinning, in this matter of proprietary preparations. The question itself is a vital one, however, and must be disposed of at an early date in a satisfactory manner, for, as a writer in a medical journal asserts,[7] "Secrecy in medicinal preparations is dangerous to patients, destructive of science and promotive of fraud and avarice." For the correction of this really heinous abuse there is but one rational remedy: the development of a truly ethical profession of pharmacy.

That physicians, and by physicians I mean medical men having ethical ideals, are willing and even anxious to assist pharmacists to improve themselves and their calling, is amply evidenced by the numerous kindly words of advice and encouragement to be found in the same medical journals that appear to be the most bitter in their denunciation of supposed abuses. One writer in *American Medicine* says: "The physician is dependent for his results in drug therapy upon the honor and skill of the pharmacist. It is therefore in the interest of science and of mankind that a sharp line be drawn between the honorable and the dishonorable, the careful and the indifferent, the skilled and the blundering among pharmacists. It is likewise important that the pharmacist be more than a salesman of manufactured articles. No one needs a liberal preliminary education and four years of laboratory training to hand out ready-made preparations." [7]

Dr. A. L. Benedict, in his paper on "Ethical Pharmacy," quoted above,[3] gives several practical suggestions as to how the existing evils might be remedied, and in a personal letter on the same subject says: "With regard to the question, Is a profession of pharmacy necessary or desirable? it seems to me there is no possible successful argument on the negative side. Indeed, I am by no means entirely opposed to the present make-up of the drug-store with its extra professional branches, but do not believe that the pharmacist should pose as a physician. My objections to such practices (nostrum vending and counter prescribing) are, (1) that it undermines health, and kills human beings; (2) that it is ultimately contrary to statute law; (3) that these are facts because the pharmacist is not competent to practise pharmacy. I believe that any pharmacist who would drop his stock of patent medicines and put up a sign that he was not a physician and would not handle products which were to be taken indiscriminately, and who would demonstrate by consistent, honorable methods, that he meant what he said, would, after a year or two, receive the cordial support of the medical profession and of the intelligent laity."

Commenting on the probable status of "The Pharmacist of the Future," the *New York Medical Journal*, in an editorial,[8] says: "The physician frequently finds himself disposed, almost constrained, to seek for information from the pharmacist," and further expresses the opinion that the necessary training that must be accorded the

pharmacist of the future will enable him to render conspicuous service, which will go far to lessen the time spent in clinically testing comparatively worthless medicinal preparations.

The need of reliable advisors on matters pharmaceutic, particularly in connection with the so-called newer remedies, is further emphasized by a paper on "The Trend of Modern Prescription Writing," by Dr. M. Clayton Thrush, recently read before the Philadelphia County Medical Society.[9] In this paper the writer points out some of the more evident shortcomings in the present-day methods of teaching pharmacy in medical schools, and concludes that "the trend of modern prescription writing is in favor of proprietary preparations" largely because the young practitioner does not possess the requisite knowledge to combine drugs or preparations without forming unsightly or dangerous compounds.

This paper also emphasizes the inefficiency, from a practical point of view, of attempting to teach the practice of medicine by theory alone, and offers the best possible arguments on the necessity and importance of hospital experience to young practitioners. Such a post-graduate course of hospital training was strongly advised by Dr. John H. Musser in his address as President of the American Medical Association.[10] The practical utility from a pharmacologic point of view is made somewhat doubtful, however, by the assertion of Dr. O. T. Osborne, who says:[11] "When our graduate goes to a hospital he begins to use the hospital formulæ, and forgets entirely how to write prescriptions." This assertion, made by a teacher of considerable experience, is unfortunately too true, and is, in a measure at least, largely due to the subordinate position occupied by the hospital pharmacist.

How far or how much individual hospital pharmacists are to be blamed for the lack of confidence they are able to inspire, I am not in a position to say. Certain it is that as a class, who should have every facility for original observation and study, they have contributed little, very little, to the sum total of pharmaceutic knowledge.

That there is a wide and interesting field of work for the hospital pharmacist; that he is, in fact, the logical beginning of a profession of pharmacy, and that some of our ablest and busiest medical men have devoted considerable thought to the problem, is evidenced by the following extracts from letters recently received, rom Dr. Wil-

liam Osler, of Johns Hopkins Hospital, Baltimore, who says: "What you say about the hospital pharmacist is very true. I have long felt that we have not done our duty here, as, perhaps, we might, in stimulating this important branch of our work.

"I feel that the department of pharmacy in our large hospitals should be made co-ordinate with the other important divisions that the teaching of medical students practical pharmacy should be part of the work, and that all possible opportunity should be given the men in charge to keep themselves abreast with the most advanced work in their specialty.

"Would it not be a good thing for the hospital apothecaries to organize a special society in which their work could be codified and brought before the profession?

"It might be well to get a list of the pharmacists at the different large hospitals throughout the country, and then send them a circular urging the formation of such a society or club."

Without going into a detailed discussion as to my own ideas on the feasibility of these suggestions I would say that other medical men have heartily endorsed the sentiments here voiced by Dr. Osler, and practically agree that able and properly trained hospital pharmacists should, and would, be important and valuable factors in the development of the science of medicine. Further than this, a really able body of hospital pharmacists should and would have a beneficent influence on the evolution and development of a profession of pharmacy the members of which would be imbued with high ideals and would in turn be duly appreciated for their worth and attainments. In summing up, then, I would say that the suggestions as here outlined would necessarily include:

(1) A somewhat radical change in our present standards of pharmaceutical education.

(2) The introduction of hospital pharmacists with professional ideals and scientific attainments.

(3) The ultimate complete separation of the trade in drugs, nostrums, soft drinks and tobacco from pharmacy and the ultimate establishment of pharmacy on a high professional plane.

In conclusion, I would say that while these ideals may appear to you impracticable, I believe their achievement is not impossible, and, further than this, is absolutely necessary to rescue the practice of pharmacy, and with it every department of medicine, from the

slough of commercialism in which they are slowly but surely sinking.

TITLES OF PAPERS REFERRED TO.

[1] "Is Pharmacy a Profession?" *American Druggist*, Dec. 19, 1904, p. 419.

[2] "The Degradation of the Drug Store." *American Medicine*, July 2, 1904, p. 1.

[3] "Ethical Pharmacy." *American Medicine*, Nov. 26, 1904, p. 935.

[4] "Careless Mistakes of Good Druggists." *American Medicine*, July 9, 1904, p. 87.

[5] "Our Pharmacy Laws." *American Medicine*, Dec. 31, 1904, p. 1122.

[6] "The Relation of the Physician to Proprietary Medicines." *The Journal of the American Medical Association*, Dec. 3, 1904, p. 1675.

[7] "Proprietary or Secret." *American Medicine*, No. 12, 1904, p. 863.

[8] "The Pharmacist of the Future." *New York Medical Journal*, Nov. 12, 1904, p. 937.

[9] "The Trend of Modern Prescription Writing." *Journal of the American Medical Association*, Jan. 7, 1905, p. 35.

[10] "President's Address." *Journal of the American Medical Association*, June 11, 1904, p. 1533.

[11] "Discussion." *Journal of the American Medical Association*, Dec. 3, 1904.

THE ETHICAL RELATION OF PHARMACISTS AND PHYSICIANS.

There was an interesting discussion following the reading of three of the preceding papers which were presented at the Pharmaceutical meeting on Tuesday evening, January 10th. Some of the remarks are published at this time.

DR. HENRY BEATES, JR.,

said: I regret that Dr. Musser has gone, because while with much that he said I agree, there is also much with which it is impossible to entertain a like opinion. If his remarks were correctly understood, the inference was given that, in the near future, there would be little or no use for drugs or medicines, and, consequently, little or no use for pharmacy.

That such an ultimate condition could be possible cannot for one moment be even conjectured. It is difficult to understand how such a question could so much as arise. Let us see why. Dr. Musser referred to the fact that physicians are learning the proper use of fresh air, sunlight and food in the treatment of disease. May they not also begin to learn how to properly employ medicines in the treatment of human ills?

As far as these go it is a distinct advance in treatment; but, at best, only a departure, *not an advance*, from a dangerous and ignorant administration and use of powerful remedies that are frequently, because of an incompetent profession, combined in all sorts of ways, certain to work injury rather than benefit, and administered with little or no understanding. As the profession is, there are those who are unable to recognize whether or not their prescriptions are being taken!

'Tis a serious and difficult work for a human system to recover when stricken with disease, even when *unassisted* by the skilled administration of drugs known to exert favorable influences, but when such an afflicted being is obliged to contend against both disease and unskilfully administered and, because of incompetence, injuriously given drugs, a return to health is almost impossible; and most direful consequences are certain to frequently result and unquestionably do!

Therefore, the commendable and comparatively only safe resort to *only* fresh air, sunlight and proper food, while an advance in treatment in one respect, *and safe*, is at the most *and* best but a departure from a dangerous practice, based upon and resulting from ignorance and incompetency.

In addition to these there frequently, *not always*, must be skilled and competent medication. There are certain facts of existence, affirm, deny, and theorize about them as you will, which, nevertheless, *exist* in their inherent and originally *created potentiality*, no matter what may be done for or against them. They are and dare not be denied.

With these *facts*, it is reverently said, that an Omnipotent and Omniscient Being has created, are associated unalterable and never-varying laws! With these laws the qualified *practitioners of our profession* MUST *comply!*

The cells composing the various tissues and organs of our bodies are affected in their life actions and functions by those influences which are the consequences of these immutable laws, and in the vast vegetal and mineral world, thus created, are principles (MEDICINES AND DRUGS) which, like the principles of disease-causing factors, so affect the cells of the human body, that, if rightly used by an *educated*, *competent*, and *skilled profession*, WILL restore diseased conditions to health. This truism cannot be denied.

A little information will be given to you from behind the scenes, as it were, of medicine, as it will enable you to understand why a spirit of therapeutic *nihilism* occasionally manifests itself.

At the last session of the State Board of Medical Examiners a question was asked that inquired for the evidence of the possession of the knowledge of a fundamental principle, without which many diseases cannot possibly be *understood*, although their symptoms can be memorized.

Memorized and *repeated, but* NOT *understood!* please observe, and, consequently, not properly and intelligently treated even if only with pure air, sunlight, food and rest.

The question was: discuss symbiosis with special reference to pathogenesis. It is perhaps permissible for me to explain that some disease-producing organisms require oxygen for their activity, and the exercise of their morbid powers, and that if such organisms enter the body, they will be inert if oxygen is not available.

There are other organisms, also disease-producing, which thrive and exert their disease-producing powers in the absence of oxygen, and, as these so-called germs in nature are frequently associated, it is easy to understand that if the non-oxygen microbes grow, and in their vital activity evolve from the tissues oxygen, how the virulent oxygen-demanding germ will thereby be supplied with the necessary environment for its activity and result in disease.

Thus symbiosis renders comprehensible how, respectively, oxygen- and non-oxygen-requiring germs may or may not afflict the human economy with diseases like tetanus, typhoid fever, diphtheria, etc.

It cannot be denied by any one, except those who are inadequately educated, that medicines and drugs, those means supplied by an all-wise Creator, which also similarly affect the cells of the human body, will be, when intelligently administered, proven to be a vital necessity for the proper treatment, relief and cure of disease.

Pharmacy, therefore, instead of becoming obsolete and useless, I affirm, with all the emphasis at command, will be still more strongly demanded than ever before, and just as soon as pharmacy and medicine will only admit to their ranks those who are adequately educated, this one great and undeniable fact of existence will be an unquestioned reality. The time has come not to dispense with our respective professions, but with those who are not competent and fit to be identified with them.

A word as to pharmacy as a specialty of medicine. A superficial thought suggests such a possibility, but serious contemplation negatives the idea, because comprehension of the vast field embodied discovers what necessarily *must* be a separate, distinct and important science and art.

It can only be possessed by those who devote their entire life and talents toward securing a *pure materia medica*, and possessing the ability to properly prepare and compound the same for accurate administration. This *qualification* can in no sense constitute a specialty of medicine. It is essentially, naturally and inherently an indispensable auxiliary to medicine—a substantial means to an end, as needful to the success of the art of treating disease as is the rudder to the proper and certain navigation of the ship. One cannot exist without the other. Alone either is comparatively useless, and the ultimate and practical outcome of both renders each equally important and an indisputable necessity.

MR. M. I. WILBERT

said: In reference to the relations between physicians and pharmacists, there are but two points on which I should like to add something further.

The assertion made by me that the pharmacy of the future might be developed as a specialty of medicine, etc., no doubt constitutes a misuse of the word specialty, as we naturally think of it in connection with the practice of medicine at the present time. If, however, we consider pharmacy, as we should and must, as a part, or a department, of the science of medicine, we may with propriety refer to it as a specialty of that science, dealing particularly with the collection, preparation and preservation of the materials used in the study, prevention and cure of disease.

The manufacture and sale of nostrums is undoubtedly the most general, but nevertheless the most deplorable, practice of the present-day pharmacy in America. It is also the one feature which, more than any other, will serve to bring about a radical change in the practices, position and condition of the pharmacist of the near future. In this connection it may be said that many of us have failed to keep in touch with the medical discoveries and the resulting change in ideas and medical practices of later years, and therefore have failed to realize that ideas and practices which were con-

sidered permissible, if not absolutely correct, fifty years ago may be, and many of them rightly are, considered obsolete, if not positively dangerous, at the present time.

Broadly speaking, nostrums may be classed in one of two general groups. (1) Those popularly termed patent medicines, and properly consisting of all medicinal preparations advertised or sold directly to the lay public, and (2) those preparations, generally known as proprietary remedies, that are exploited to, or through, medical practitioners. Preparations belonging to either of these two divisions are secret preparations, so far as any definite knowledge, by others than the manufacturer, of their composition or contents is concerned. In addition to this, the claims that are made for the efficiency and usefulness of these various preparations are necessarily more or less misleading to a large number of people.

To appreciate this latter statement more fully, it must be remembered that there is what may be termed a psychological element necessarily connected with all matters medical. For instance, an individual suffering with some real or supposed complication of diseases will invariably take a different view of a verbose, but really meaningless, statement of supposed facts than one who is positive that he is neither ill nor likely to be ill in the near future.

The same is true of physicians. The man who has had a wide and varied experience, and who is well versed in the rudiments of drug therapy, will take an entirely different view of the problematical claims that are made in connection with a secret remedy than the one who has had little or no experience in this particular line. Moreover, the results obtained by a man of the latter type from the use of a nostrum, are usually misleading to him, and through him to others, from the fact that he has been able to observe only the fact whether or not his patient improved, or seemed to improve, under the influence of a certain drug or compound, forgetting entirely that there may be, and really are, dozens, if not hundreds, of additional factors that may and do contribute towards the ultimate result in any given case. After all, then, it is simply a question of point of view, or of seeing truth as we are able to recognize it. If our education or information is such that we can get above the facts in the case, and review them collectively as a whole, we can readily form a satisfactory and correct opinion, based on the ultimate result. If, however, we are not in a position to command this necessary broad survey of the sum

total of all the facts and factors in any given case, our ideas and opinions, and all our statements based on them, will necessarily be the product of our estimation of such facts and factors as are evidenced to us from our point of view.

This line of reasoning explains why so many really honest men in the drug business to-day continue in their (supposed) time-honored prerogative of dispensing mixtures for this, that or the other disease regardless of the fact that, by imparting a false feeling of security to a patient or his friends, they, not infrequently and unwittingly, are the direct cause of unnecessary life-long suffering, or assist the grim reaper, death, to fill an untimely and premature grave.

It must be remembered, also, that in the minds of many physicians counter prescribing is not confined to those isolated cases where a druggist, without license, looks at the tongue, feels the pulse and takes the temperature of a patient, with a view of doling him out a mixture especially designed for his particular case, but that, on the other hand, it includes also the making and sale of panaceas or nostrums designed for the cure of diseases that are still, though erroneously, considered to be well known and definite entities.

Of proprietary medicines, little need be said, in conclusion; they are best described as a futile attempt of the blind leading the blind along unknown and comparatively dangerous paths, and cannot be tolerated in the practices of professional or scientific men.

PHARMACY AND CHEMISTRY AT THE WORLD'S FAIR.

By Carl G. Hinrichs, Ph.C.,
Professor of Chemistry, Marion-Sims Dental College.

(*Concluded from Vol. 76, p. 573.*)

VII. PHARMACEUTICAL EDUCATION.

The Louisiana Purchase Exposition was of great educational value in some directions; in others, and especially along the lines of pharmaceutical teaching, it was lamentably lacking; for we found only two pharmacy schools represented in the Palace of Education; one from New York City, the second from far-away Sao Paulo, Brazil. The small exhibits of these two schools cannot be said to represent pharmaceutical education. We are glad to say that the profession of pharmacy was not entirely without representation, for nearly all

national exhibits in this building had some publications on the general educational work of the respective country—Germany excepted. It is but natural that those countries where the practice of pharmacy has no marked characters of the purely business feature (such as patent medicines, soda, cigars, laundry, and the like) the pharmacist is expected to comply with very rigid educational standards. In this connection I may state that the gentleman in charge of little Sweden's exhibit stated to me that a certain large pharmaceutical house of our country extensively advertised a certain nostrum of wonderful medicinal virtues; the government authorities promptly took up the matter, which ended Yankee enterprise in that chilly clime. Nor must the reader believe that lands where one pharmacy to every 20,000 inhabitants or more is necessarily a veritable bonanza for the pharmacist; for not all people are such voracious patent medicine consumers as the Americans and the English. The people are also more addicted to the use of the homely herb of their garden, consequently the taking of a little bitter wormwood tea takes the place of patents among the hardy Hungarians, Swedes and mountain dwellers of Europe generally. If we desire to learn from any country, it is from the land of the mother tongue and similar racial peculiarities—Great Britain.

The educational side of the Britisher is distinctly British, in that all tests depend upon examinations by certain authorized bodies or boards. Any one may be examined for a degree before their universities, if he feels able to do it, whether he studied in England or not. So is the Pharmaceutical Society authorized by Parliament to conduct examinations to determine the fitness of a druggist to practice his vocation. Great Britain is always derided in some quarters, on account of its excessive examinations. It is generally admitted by the more advanced men in pharmacy and science that a single examination, or a number of them, cannot determine the fitness of a student. Professor Remington emphasizes this in a recent paper published in this JOURNAL. The examination is very good for many mediocre memorizers, though not exceptionally brilliant in the class-room; a certain race is always good at the so-called final, as I have noticed.

Professor Searby, himself a graduate of old England's most noted school, that of the Pharmaceutical Society, has recently championed higher requirements for entry to the American College. We may,

therefore, be pardoned for taking up what will undoubtedly prove a very dry subject: how other people must study to become pharmacists. The Britishers have probably realized the fact that the future chemist begins in the drug-store; naturally, they worry not at all about how fit the student that enters the college may be; in fact, he need not attend any school, to become a licensed chemist: in this, then, they are like our State requirements. We Americans are always too fast; the Britisher is proverbially slow. How excessively slow is their way to the young man's goal! He must first become a student apprentice at the age when he will still suck "mints;" should he be permitted to attend to these delightful duties without a preliminary education? Certainly not. The young Britisher must know his Euclid and Latin thoroughly, in addition to a comprehensive knowledge of the mother tongue, before he may enter upon the above mentioned pleasant occupation. Why should our colleges worry about the educational abilities of their students, when the State does not? Why pester the legislators to recognize their diploma as a mark of peculiar fitness? the lawmakers always scent graft a mile off. Why cannot these self-same schools go before their state association and work up a little steam in the right direction, make the trade see the advisability of having apprentices, or, as we call the ever moving young men, "clerks," attain at least a good, sound, old-fashioned English education, before they enter the store? This would probably raise a howl among many druggists; they may urge that the boys will be too dainty, stuck up, look down upon many of the new registered druggists as ignoramuses, and similar unwarranted notions may be flung about; also that most popular reason, the boys will want more than they are worth. It is just these men who are now complaining that they cannot get help which is worth what they pay; this class of druggists will always complain, but will not think ahead. If such a demand were enforced by law, the result would tend to cause older boys to enter the drug-store; young men who would have a higher consideration of their employer than the thoughtless youngsters the druggist now delights to hire because they are cheap. If any one who has access to the published class pictures of the English schools, such as Muter's, Brixton, or of the Metropolitan, will compare them with class pictures of our Western schools, he will not fail to notice the more mature appearance of the English

students. Some American students are no more than kids—all the way from sixteen years down.

The young man who wishes to enter a British chemist's shop (corresponding to our drug store) as an apprentice, must pass before the recognized board in the following topics: English grammar and composition, Latin, a modern language, algebra, arithmetic and Euclid. This bill of fare would correspond to at least the fourth year in one of our American high-schools. The boys will be about seventeen to eighteen years old when they pass this examination; nor is the examination gratuitous, for it has a two-guinea fee attached, *i. e.*, $10.00.

After the young man has fulfilled his academic requirements, which fact is officially recorded by the examining board, he may enter the "chemist's" shop as a student or apprentice. This English method seems decidedly more logical than that of our States, which do insist on some educational requirements before they admit to the examination for assistant. There are cases on record where young men have graduated from reputable Colleges of Pharmacy and have failed to pass this preliminary examination. It seems rather cruel and decidedly unreasonable to require such young men, who have shown ability by their success in obtaining the degree Ph.G., to make up such elementary deficiencies. Medical Boards in many States demand that the medical student shall have the requisite common schooling before he may enter a medical college. Naturally, such boards believe in the *quid pro quo*, and no young doctor will ever be held up by the board later on, as is the case with the druggists mentioned.

After three *legal* years as apprentice, the British applicant may take the so-called minor, for which he pays a fee of $50. He must also have attained his majority. This English examination covers more ground than that of the first year in the American College. It also embraces such important features as a good knowledge of the Poison Act, and a prompt and accurate dispensing of a prescription. The examiner grades him on the time it takes, and his proficiency in the art, as evidenced by an actual filling of the prescription. So we see such a young man must be a capable professional aid to his employer.

Later the major examination, a most thorough and searching probing of the future "chemist's" knowledge, chemical, pharma-

ceutical, botanical, posological, etc. For this the examinee must pay a fee of \$150, and the successful candidate will then be registered as a "chemist." The Pharmaceutical Society of Great Britain strictly enforces the law against all who attempt to circumvent or evade these requirements of the English Pharmacy Act.

It will have been noticed that the English law takes no cognizance of the College of Pharmacy, or in fact of any school. Continental nations, on the contrary, do demand of the applicants for license to practice an attendance at some pharmacy school; searching examinations are not, however, overlooked. France may be taken as the type case of the dignified profession of pharmacy of Germany, Sweden, Russia, Portugal and the other European countries.

The French law demands of the prospective pharmacien de premiere classe (the grade of pharmacien de seconde classe is no longer) that he shall first spend three years in a pharmacie. He must work practically in the laboratory, also shall the élève, at regular intervals of time, have his name inscribed on the records as being actually in harness. To be permitted the honor of making these "inscriptions," he must first of all be a bachelor of arts. His three years completed, as attested by his inscriptions, he must submit to an examination called the "validation de stage." This examination costs 25 fr. 25, that is, \$5.05; this is reasonable, but how many of our young registered druggists would like to face this first mild examination?

"Validation de stage" comprises four topics: (1) the preparation of a chemical or galenical preparation, as found in the Codex (four hours are allowed for this ordeal); (2) he must prepare a magistral preparation; (3) recognize thirty plants or parts of plants pertaining to the materia medica; (4) he must answer divers pharmaceutical questions. Each of these last three topics requires no more than thirty minutes to answer. Having successfully passed this "validation de stage," the young man must enter one of the écoles de pharmacie; all have the same identical courses by legal decret, but the école superieur de Paris is the most noted.

Three years pass at the College of Pharmacy. Every three months must the student be inscribed on the record, showing that he is attending to his duties. At the end of each year the student submits to an examination, which is both oral and practical.

We can do no better than to copy the subjects in which he is examined.

First year deals with the physico-chemical studies and their application to the subject of pharmacy.

Practical examination in chemical analysis.

Oral examination in physics, chemistry and toxicology.

Second year dealing with the natural sciences and their application to pharmacy.

Practical examination in micrography.

An oral in botany, zoology, mineralogy and hydrology. If the student fails in his practical examination in either of the first two years, he fails, and must take the entire work of that year over again.

The third year studies are the truly pharmaceutical. The examination embraces two parts. The first part embraces a practical examination; the quantitative determination of the strength of a medicament; also the recognition of simple and complex medicaments or preparations; this corresponds to our so-called recognition of specimens.

The oral embraces the subjects: chemical and galenical, pharmacy and materia medica.

The second part of the final examination takes up four days. Eight chemical or galenical preparations must be made; the student is also subjected to a thorough oral examination on these preparations.

Having successfully passed all examinations and been in regular attendance during these past six years, the bachelor of arts becomes the pharmacien de premiere classe.

In conclusion, we may say that the British custom seems more applicable to American conditions at the present time. This would gradually raise the dignity of pharmacy as a profession. Then in the future the French or Continental system might gradually be introduced.

THE PROPER SCOPE OF SCIENTIFIC (SO-CALLED EXPERT) TESTIMONY IN TRIALS INVOLVING PHARMACOLOGIC QUESTIONS.[1]

BY SOLOMON SOLIS COHEN, M.D., OF PHILADELPHIA,
Professor of Clinical Medicine in Jefferson Medical College.

(*Continued from p. 13.*)

(6) That one must be expected to answer frankly all questions by opposing counsel, without reservation or evasion, regardless of the effect of such answers upon the theory of either side.

(7) That one is not to be asked irrelevant questions, for the purpose of consuming time or raising clouds of dust; or to be asked to make captious criticisms of the testimony or methods of others; or in any way to be made a party to methods of presentation of facts and opinions, which, however admirable from the viewpoint of an attorney's efforts to serve his client, are opposed to the spirit of truth-seeking science.

It is not to be expected that one can alter the badgering, hectoring, and efforts at confusion which present juridical standards permit and even applaud in cross-examination. But one can at least refuse to supply ammunition for such practices, to support them, or to countenance them.

A more difficult ethical question than we have yet considered is that presented to a chemist who has been called upon to make an analysis of suspected substances, when his analysis reveals the presence of that which the attorney consulting him wishes absent, or *vice versa*. Is he to insist upon being called as a witness? It is no longer a question of testifying—for the attorney will not wish him to do so—but of not testifying. An analogous question is sometimes presented to pathologists. How shall it be decided? Suppose a chemist or a pathologist has been asked to examine the tissues of a person suspected to have been poisoned, for evidence of the poison or its effects? He fails to find such evidence. This is not a mere matter of opinion, but of fact. Or, take a somewhat simpler case: suppose a chemist is asked to examine suspected powders or liquids or foodstuffs for the presence of poison and fails to find it? It is possible that his negative testimony might help

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[1] An address delivered before the Philadelphia College of Pharmacy, November 15, 1904.

the accused person. If the public prosecutor nevertheless proceeds to trial, being satisfied upon other grounds that such is his duty, and fails to call the chemist or pathologist who has made the negative finding, is it the latter's duty to volunteer his evidence? The answer to that question is beyond the scope of this paper, but, nevertheless, the question needs to be stated.

SUMMARY OF CONCLUSIONS.

(1) The difficulties attending expert evidence upon pharmacologic questions could be in large part obviated (*a*) by adopting the principle of *controlled examinations* with *preservation of portions of materials examined* and *exhibition of material results*; (*b*) by submitting scientific questions to the judgment of a jury or commission of experts who should hear the relevant testimony in the presence of both parties and their counsel, and report to the court, and whose unanimous report or discrepant reports should be submitted to the trial jury as part of the evidence in the case. Before such a commission scientific experts might be allowed to appear frankly as advocates arguing upon evidence submitted, but no mere opinions should be given as evidence; it being the function of the commission to formulate opinions for the guidance of the court having final decision of the case.

(2) As the plan suggested in the foregoing paragraph is not likely to be adopted for many years, if ever, the duty devolves upon physicians and pharmacists called as expert witnesses under the present system to guard their own actions and evidence so that the reproach of partisanship and venal interest which now, justly or unjustly, attaches to the testimony of experts upon pharmacologic questions may be removed from the honest and competent majority and a sharp line of distinction be manifest between them and others.

(3) The chief difficulties that honest, sincere and competent expert witnesses have to meet are of four orders:

(*a*) *The necessity to state technical matters in untechnical terms.* There is no way of avoiding this and the expert can only meet it as best he may, deliberately using technical terms when necessary to make the record complete, and afterward explaining them as well as possible in untechnical language.

(*b*) *The combination of witness and advocate in the same person.*

This tends to the presentation of partial and therefore partisan testimony, which, in the attempt to draw conclusions from insufficient evidence, may lead to undue magnification or minimization of certain facts, to the slurring or suppression of material data, to the introduction of irrelevant matters and especially to captious criticism of the investigations or opinions of others. This can be remedied only by the expert himself.

(*c*) *The confusion of judgments of fact, the result of scientific research and analysis, with opinions; and like confusion concerning statements of facts of general scientific knowledge.* This can be remedied only by calling the attention of courts and lawyers to the principles involved and thus educating them to a better method.

(*d*) *The request for formulation of an opinion addressed to one whose studies have not qualified him to speak authoritatively upon the special question involved.* The remedy for this lies exclusively with the expert himself.

(4) It is not fair to condemn lawyers for the abuse and misuse of expert evidence, seeing that lawyers can use an expert witness for no purpose which the witness refuses to be used for. Courts may, however—from the viewpoint of scientific investigation—err both in the admission and in the exclusion of expert testimony.

(5) Newspapers and the public in general usually do grave injustice to the members of our professions, inasmuch as they do not know how often physicians, chemists, and pharmacists, after examination of the facts in special cases, refuse to testify on behalf of the interests that have consulted them.

(6) Physicians and pharmacists asked to give expert testimony should stipulate that they are to tell the whole truth and to answer frankly and fully the questions of counsel on the other side; that they are not to be asked to lend themselves to pettifogging or obscuration of any kind; that their opinions are to be held subject to modification by any additional facts that may be disclosed; and that they are not to become advocates on or off the witness stand.

(7) The expert or scientific advocate has an honorable and useful field of work as assistant and adviser to counsel; but his place in court is by the side of counsel, not on the witness stand.

1525 WALNUT STREET.

A RECORD OF TWO TOXICOLOGICAL INVESTIGATIONS.[1]

By Geo. M. Beringer.

The intent of this paper is to record for scientific reference the toxicologic investigations made in two celebrated trials in Burlington County, N. J., in both of which women were defendants, and indicted for murder in the first degree. These have heretofore been reported only in the newspapers, which reports are not permanently available records or sufficiently accurate for scientific reference.

The case of the State of New Jersey *vs.* May L. F. Haines. On March 31, 1901, Gwendoline Haines, a frail child, aged two years and nine months, stepdaughter of the defendant, died without having had sufficient medical attendance, and under circumstances that were considered suspicious. The only other occupants of the house at the time were Mrs. Haines and her infant son, about one year old.

About eight o'clock in the evening of that day the mother called at the office of a physician nearby, explaining that Gwendoline was suffering from a slight cold, and he prescribed a few homeopathic pellets of aconite. About one hour afterward she again called and requested his immediate attendance on the child, who, she said, had a convulsion. The physician responded promptly, as he lived but a few hundred yards away; but on arrival at the house found the child dead. He discovered no evidence of convulsions, but numerous bruises on the body, and as the neighbors told him of harsh treatment and punishment having been administered by the stepmother, notably a severe beating the day prior, he declined to issue a death certificate and referred the case to the coroner.

The undertaker, however, was promptly summoned, arriving at midnight; he immediately embalmed the body, injecting into the abdominal cavity near the navel about 1 pint of fluid. The following day the coroner issued a burial permit, and within a few days the body was interred in Harleigh Cemetery, at Camden, N. J.

Relatives on the child's maternal side, noticing the scars and bruises on the child's corpse, demanded an official investigation, and on Saturday, April 6, 1901, the body was disinterred, and a post-mortem examination made by Dr. R. H. Parsons and Dr. A. H. Small, the authorities anticipating the finding only of evidence of severe

[1] Read at the Pharmaceutical Meeting held at the Philadelphia College of Pharmacy, November 15, 1904.

beating. These doctors reported that they found the nose broken, eyes black and blue, the upper lip deeply cut, and the left ear partly torn from the scalp, and numerous other bruises on the body and head. The direct cause of death they then considered as due to meningitis, the meninges being greatly congested and angry red immediately underneath a decided contusion of the scalp.

There was very little to suggest even the possibility of criminal poisoning, merely some abrasions and scars on the chin and lower lip attracted the attention of a relative as possibly indicating burns from carbolic acid. Desiring to satisfy the imaginations of the relatives, portions of the viscera were removed, and after placing these in jars, were handed to Mr. J. E. Doughty, a grand-uncle of the child, to deliver to a chemist. With no definite idea as to what to do, or as to what was expected of him, he carried them to Philadelphia to consult with his brother, and he returned again that evening to his home at Haddonfield, N. J., and retained the package containg these jars in his possession until Monday morning, April 8th, when finally, acting under positive instructions from the prosecutor, he delivered them to the writer, at 11 A.M.

The viscera were contained in two 1-quart Mason's fruit jars, wrapped in newspaper and enclosed in a paste-board box, and then placed in a wicker-ware hamper, which was securely tied with twine, and showed no evidence of having been tampered with. On opening the hamper and package I found the two jars, the one had a piece of paper tied to it, on which was inscribed, "This jar contains stomach, liver and kidneys." It contained, however, the stomach, part of liver, one kidney and the heart, and all in a well-preserved condition, and in addition, a small amount of liquid exudation. The other jar contained the brain, and was so marked by a piece of paper attached by a string.

The lack of proper precautions exhibited in the placing of a number of organs in the same jar, leaving the jars unsealed, and for nearly two full days in the custody of an unofficial citizen, to be delivered to the chemist, even after having been carried out of the jurisdiction of the State, were certainly inconsiderate acts, and, in the light of subsequent developments, it was feared at one time might have proved a serious detriment to the case. Consequently, the prosecutor, after receiving my report, decided to have a second autopsy, which was made by the same physicians on April 20th,

when the following materials were removed: the remaining kidney, 8 inches of the intestines, a section of the liver, a section of the lung, the spleen, and portions of the muscular tissue from the calves of both legs. These were placed in separate, new, clean jars and sealed, and delivered in person to Prof. Frank X. Moerk for analysis.

The Stomach and Contents.—The stomach was first taken for examination. It was in good condition and tied at both ends with a white string in surgeon's knots. It was cut open and the contents poured into a clean dish. The mucous surface was carefully examined, and was almost of a uniform pale pinkish color, and showed no evidence of undue inflammation or reddening. In a few places some mucus-like substance still persisted, and an examination by the unaided eye, and also with a pocket lens, failed to disclose any particles of grit or crystals. There were only a few fine particles, resembling charcoal, adhering to the wall at different points. The contents consisted of 50 c.c. of partly digested food, resembling and having the odor of sour milk. The surface was washed with the distilled water, and the washing added to the contents, and the entire bulk made up to 100 c.c.

One-quarter of this amount (25 c.c.) was taken and rendered distinctly acid, and distilled for volatile poisons, such as hydrocyanic acid or carbolic acid, which had been suggested; the results, however, were negative. Another 25 c.c. was tested for alkaloids or other organic poisons, but I failed to get any results, and a small portion was then acidified and tested with hydrogen sulphide. It yielded a decided yellow precipitate. This precipitate was found to be insoluble in hydrochloric acid, but soluble in ammonia, ammonium carbonate and potassium bisulphite, indicating that it was arsenious sulphide. This conclusion was readily confirmed on the application of Reinsch's test with a portion of the sulphide. Crystals of arsenic trioxide were readily obtained by sublimation from the copper, and on dissolving these from the tube with a small quantity of boiling water, the solution readily responded with characteristic arsenic precipitates with ammonia-cupric sulphate and silver nitrate. A small portion of the sulphide mixed with a dry sodic carbonate, and potassium cyanide was readily reduced, giving a garlic-like odor, and forming a metallic ring on the tube. With sodium oxalate as a reducing agent, similar results were obtained, and these

metallic rings or mirrors were readily oxidized to arsenic trioxide. The remaining one-half of the stomach contents was taken for the quantitative determination of the arsenic. This was mixed with 5 c.c. hydrochloric acid and 50 c.c. distilled water and warmed and strained, and the residue again washed with water acidified with hydrochloric acid, the strained liquids mixed, filtered and precipitated with hydrogen sulphide. The sulphide was purified by solution in ammonium hydroxide, and reprecipitated with hydrochloric acid in the presence of a few drops of hydrogen sulphide solution, the solution and reprecipitation being repeated until it was free from organic matter. The purified sulphide was then dried and washed with carbon disulphide, then with petroleum ether, dried, finally dissolved off the filter with ammonium hydroxide and evaporated on a tared watch crystal. The yield of arsenic sulphide was ·1 gram, equivalent to 2·48 grains of arsenious acid, for the entire stomach contents.

In order to apply Marsh's test, a portion of the sulphide was oxidized in a porcelain crucible with nitric acid, and then fused with sodium carbonate and sodium nitrate. The fused mass dissolved in water, acidified with sulphuric acid, and evaporated until fumes were given off, and then cooled, and diluted with water. This solution containing arsenic as sodium arseniate, was used in the Marsh's test, and a few drops were sufficient to give beautiful tube and plate mirrors of arsenic.

Stomach Wall.—The membrane of the stomach, or stomach wall, was cut up into small pieces and digested in a water bath, by the method proposed by Fresenius and Babo, using 100 c.c. water and 40 c.c. pure hydrochloric acid and potassium chlorate gradually added, until a clear solution resulted. This was filtered and warmed until the odor of chlorine was dissipated, and the arsenic then precipitated as sulphide, and the sulphide purified from sulphur and organic impurities in the same manner as that obtained from the stomach contents. The results calculated as arsenic trioxide, gave 3·348 grains obtained from the stomach wall.

The Liver.—Simultaneously with the examination of the stomach contents, a portion of the liver was tested for organic poisons, with negative results. One-half of the part of the liver was utilized for the determination of arsenic, and the method of Fresenius and Babo was found satisfactory. The sulphide, however, contained a

quantity of coloring matter associated with other organic matter, so that the method of purifying by solution in ammonia was found to be inapplicable. It was necessary to oxidize it with fuming nitric acid, convert it into a sodium salt, and reprecipitate the sulphide, which was dried, washed with carbon disulphide, petroleum ether, and finally dissolved in ammonium hydroxide and evaporated on a tared watch crystal. The results indicated 3·93 grains arsenic trioxide present in the section of liver I examined.

The Kidney.—The kidney was treated in the same way as the liver, and yielded 1·589 grains arsenic trioxide.

The Heart.—This was also treated in the same way as the liver, and yielded 0·49 grains arsenic trioxide.

The Liquid in the Jar.—The exudation from these organs remaining in the jar was also extracted, and yielded 0·617 grains.

The Brain.—The brain matter weighed 750 grammes, and was in a pulpy and badly decomposed condition when received. It was subjected to the method of Fresenius and Babo, and the filtered clear solution, on treating with hydrogen sulphide, yielded a decided precipitate, which separated very slowly, and which consisted almost entirely of organic matter. The quantity of arsenic present was so small as to yield only the very faintest reaction with Reinsch's and with Marsh's tests, and this trace was not ponderable.

My determinations were based upon the older method of separating the arsenic as sulphide, and yielded a total of 12·454 grains of arsenic trioxide from the materials I examined.

RESULTS OBTAINED BY PROFESSOR MOERK.

Prof. Frank X. Moerk adopted a similar method for the separation of the arsenic from the materials he analyzed. He reported that he purified the sulphide by oxidation with nitric acid, then dissolved in ammonia, and converted it into magnesium-ammonium arsenate, from which the quantity of arsenic trioxide was calculated.

The results were as follows :

The kidney weighed 557·86 grains, and yielded 1·471 grains As_2O_3.

The piece of intestine weighed 422·83 grains, and yielded 1·147 grains As_2O_3.

The spleen weighed 339·5 grains, and yielded ·656 grains As_2O_3.

The section of the lung weighed 653·85 grains, and yielded ·433 grains As_2O_3.

The section of the liver weighed 969·43 grains, and yielded 1·354 grains As_2O_3.

The muscles of the legs gave a very faint trace, not sufficient to weigh. From his examinations he isolated 5·061 grains of arsenic trioxide, a total of 17·5 grains having been recovered from the organs examined by both. Typical specimens and tests were prepared from each organ, and exhibited in the trial along with the recovered arsenic.

The Embalming Fluid.—Suspecting that the embalming fluid was an arsenical solution, a sample was immediately procured from the undertaker, who stated positively that it was from the very same case and lot as used in embalming this body. Analysis showed it to contain as the valuable ingredients, formaldehyde and potassium nitrate, but to be entirely free from arsenic. Another sample was purchased in Philadelphia, and analyzed, with the same results.

The indictment against Mrs. May L. F. Haines was moved at Mount Holly on March 25, 1902, before Judge Charles G. Garrison, Prosecutor Samuel A. Atkinson, Esq., and J. C. Hendrickson, Esq., for the State, and Eckard P. Budd, Esq., for the defense. The trial lasted for more than a week, and every point was strongly contested. The State contended that death was due to meningitis, produced by either the wounds from cruel beating, or from arsenical poisoning, or from a combination of both. The defense claimed that the arsenic found was introduced after death by the embalming process. Their contention was strengthened by recalling the undertaker, who, although he had testified both at the coroner's inquest and as a witness for the prosecution, at the trial, that he had used only this arsenic-free embalming fluid for a long time prior to this case; nevertheless, as a witness for the defense, he appeared to be in doubt, and stated that he occasionally used two other embalming fluids, both of which were stated to contain arsenic, and had used them at times with the same syringe as used in this case.

The jury acquitted the defendant.

THE CASE OF THE STATE OF NEW JERSEY VS. ANNIE R. PHARES.

The defendant in this case was charged with having killed her husband, Albert A. Phares, of Springfield Township, Burlington

County, by the administration of strychnine, on March 9, 1903. The evidence showed that her husband was strong, hearty and generally healthy, and of a cheerful disposition, who, to the day of his death, was planning and working for his re-election as constable. At this time, he had some slight ailment, diarrhœa and vomiting. On the morning of this particular day the wife drove to Columbus, a near-by town, and visited the office of Dr. J. E. Dubell, who prescribed for her husband some diarrhœa tablets, containing calomel, morphine sulphate, capsicum, ipecac and camphor, and also a liquid containing fluid extract of gentian and syrup. At the doctor's office she inquired if it would be necessary for her to obtain a prescription in order to purchase strychnine. She then proceeded to a druggist in the same town and purchased 30 grains of strychnine, which was properly labeled, and the sale entered in his poison record, along with the name of the witness to the sale, and the use for which the strychnine was said to be needed, namely, "to kill rats." She inquired here as to the amount of strychnine it would take to kill a man, and was cautioned to be very careful, as the amount was sufficient to kill many persons.

Shortly after reaching home she administered to her husband, in the presence of a friend, who had called, one-third of a teaspoonful of brown powder. Mr. Phares complained of the intense bitterness of the medicine. They all sat down in the kitchen to dinner, but the husband ate only a few spoonfuls of a proprietary food known as "Corn Crisp," and then, complaining of not feeling well, retired to a lounge in the sitting-room adjoining, the rest of the company remaining in the kitchen until the meal was completed. After a short time the defendant administered a second dose of the same powder, and about the same amount as in the first dose. The husband again complained of the exceedingly bitter taste, and very soon after this he became restless and uneasy. His muscles began to twitch and jerk, he clenched his hands, straightened out his legs, threw the head back, and had convulsions in rapid succession. In one of these paroxysms he fell off the lounge. He retained consciousness, the mind remained clear, and he continually complained of the bitter taste of the medicine, and called for water and milk. The convulsions grew worse, and he died at 7.15 P.M., before the arrival of the physician.

Immediately after the death of her husband, the defendant made

conflicting statements regarding the disposition of the strychnine she had purchased, stating that she had burned it in the presence of three witnesses, who testified that they did not see her burn any in their presence, and knew nothing at all of the purchase of the poison until it became public, through the investigation of the authorities.

The autopsy was conducted the next day by Dr. Richard H. Parsons and Dr. J. E. Dubell The body then exhibited marked rigidity, the arms and wrists were bent, and the hands clinched, the legs extended, the feet arched and turned inward, and the head thrown back. The membrane covering the brain and upper part of the cord was somewhat engorged with blood. The heart was full of dark blood, and the brain, heart, lungs and kidneys were all in a healthy condition. The post-mortem examination failed to reveal the cause of death.

The various organs removed from the body were each placed by Dr. Parsons in perfectly clean, new fruit jars, labelled, tied and sealed, and delivered to the writer in person on Tuesday, March 10th.

The Stomach and Contents.—The stomach and contents weighed 410 grammes. The external appearance of this stomach showed numerous congested blood-vessels, giving it a distinct bright red coloration throughout.[1]

The stomach was cut open and the contents poured into a clean dish. This consisted of a fluid mass of yellowish green color, which weighed 145 grammes, and mixed with this partly digested food were some fat globules, but no particles of meat. A microscopic examination showed that the solid part of the contents consisted largely of starch, many of the grains still retaining sufficient of the characteristic shape and markings by which corn and pea starch were identified. The internal surface of the stomach showed the mucous membrane of a yellowish color, marked here and there by materials of a yellowish-green color, and close inspection showed only a few small blood clots $\frac{1}{16}$ to $\frac{1}{8}$ inch in diameter, but no marked signs of inflammation or corrosion.

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[1] The writer is not a pathologist, and does not know if the appearance of the external surface of this stomach had any significance whatever, but he was impressed with the fact, because a short time before he had made the examination of the organs of a dog poisoned by strychnine, and the stomach of the animal showed very similar coloration and arterial congestion.

Preliminary tests for volatile poisons and for non-organic poisons gave negative results, but a few drops of the filtered liquid contents gave distinct creamy precipitate, with Meyer's reagent, and a decided brown precipitate with iodo-potassic iodide. The following method which had on previous occasions given good results was adopted. The stomach wall was cut up into small pieces with a clean scissors, and then beaten to a pulp, and this and the stomach contents warmed on a water bath for one hour, with 100 c.c. of distilled water and sufficient sulphuric acid added to render it distinctly acid. This was now strained through a double piece of clean washed gauze and the dregs warmed up again with 100 c.c. of acidulated water, and again strained with pressure. The strained liquid acid solutions were combined, filtrated and evaporated on the water bath to a syrupy consistence. This was extracted with alcohol by repeated application and decantation. The alcoholic solution filtered and evaporated, and the residue extracted by treating with portions of distilled water, acidulated with sulphuric acid, as long as the washing gave a precipitate with Meyer's reagent. This acid aqueous liquid concentrated on the water bath to about 40 c.c. was filtered into a separatory funnel, and then treated successively with petroleum ether, chloroform and amyl alcohol. These solvents removed a large amount of the extraneous coloring matter and organic substances from the acid solution. To remove traces of the amyl alcohol, it was again washed with petroleum ether, then separated and warmed for a few minutes to dispel any traces of the latter solvent, then cooled and returned to the funnel and rendered alkaline by ammonium hydroxide and extracted with several successive portions of chloroform. The chloroform solution on evaporation gave a residue, having a very bitter taste, giving alkaloidal reactions, and imperfectly the well-known strychnine color reaction with potassium dichromate and sulphuric acid.

This residue, not being colorless or free from foreign organic substances, needed further purification, which was satisfactorily accomplished by the following process: The chloroform residue of impure alkaloid was dissolved in a few cubic centimeters of distilled water and just sufficient sulphuric acid to render the solution faintly acid. This was now filtered through a minute filter into a small separatory funnel, and washed with small portions of chloroform as long as the chloroform extracted coloring. The solution was now

rendered alkaline with ammonium hydroxide and then sufficient acetic acid added to render just acid and again extracted with portions of chloroform as long as coloring was removed. It was then again rendered alkaline with ammonium hydroxide and extracted with chloroform as alkaloid. This process of purification was repeated until the resulting alkaloidal residue was pure white and crystalline. A considerable portion of the alkaloid was undoubtedly lost in this process of purification, but the resulting alkaloid in each case was finally pure, and gave clearly and sharply the characteristic color reaction with sulphuric acid, and oxidizing agents.

The pure strychnine thus isolated from the stomach and contents weighed 5 milligrammes, equivalent to $\frac{1}{13}$ of a grain.

A minute quantity of the recovered alkaloid was dissolved in water acidulated with a trace of acetic acid, and injected under the skin of a frog. His breathing became quick and hasty, and in a few seconds he attempted to jump, and his hind legs, after one or two jumps, became quite stiff, and in four minutes after the injection he attempted to jump but fell over on his back, and could not get up again, and he continued in this attitude, having tetanic convulsions, with straightening of the limbs, arching of back, etc. At the least touch there would be produced the characteristic strychnine tetanic spasms, and death finally resulted.

The portion of the liver weighed 320 grammes and was subjected to the same method of examination as the stomach. The coloring matters here present clung very tenaciously to the alkaloidal residue and a pure white product was obtained only after several purifications. The isolated pure white strychnine weighed 1·7 milligrammes, equivalent to $\frac{1}{39}$ grain.

The two kidneys weighed 394 grammes, and the entire amount was used in the examination. The recovered purified alkaloid weighed 2·2 milligrammes, equivalent to $\frac{1}{30}$ grain of strychnine.

The total amount of strychnine recovered from these organs amounted to 8·9 milligrammes, equivalent to $\frac{1}{7}$ of a grain or a little more than $\frac{1}{6}$ grain of strychnine sulphate. The total weight of the organs examined was approximately 2½ pounds. The recovered alkaloid in each of the three determinations was pure, colorless and gave the characteristic color reactions and the physiological test for strychnine.

The indictment against Mrs. Phares was moved at Mount Holly

on June 29, 1903, before Judge Charles G. Garrison. Samuel Atkinson, Esq., Prosecutor of the County, for the State, and Eckard P. Budd, Esq., for the defense.

The State alleged as motives for the crime the collection of a life insurance policy of $1,000, carried by the husband, and the desire of the defendant to marry a young farmhand, with whom she had maintained improper relations for a long time. The latter was admitted by the defense, and also that death was undoubtedly the result of strychnine poisoning, but the defendant testified in her own behalf, that the strychnine had been placed on a desk in the sitting-room, and that her husband must have taken same while alone in the room during the time that the rest of the party were at dinner. The powdered condition of the medicine she explained by the fact that the envelope in which the doctor had dispensed the tablets had fallen on the carriage floor, and had accidentally been trodden on by her heel on the way home.

The jury considered this plea as establishing a reasonable doubt, and sufficient to justify them in rendering a verdict of acquittal.

EDITORIAL.

EXPERT TESTIMONY.

With this issue is completed the paper on expert testimony by Dr. Cohen, which was begun in our January issue. Dr. Cohen has given no little thought to this subject, having more than a year ago read a paper on "The Judicial Determination of the Cause of Death" before the Philadelphia Medical Jurisprudence Society.

Dr. Cohen's presentation of the subject leaves no doubt as to the proper course to be pursued when either the analyst or physician is called upon to testify in cases involving pharmacological questions, or indeed as to what should be the attitude of scientific experts in general. In addition Dr. Cohen suggests a method in the employment of experts, which, if followed, would raise expert testimony from a plane where it is too often the subject of ridicule at the hands of both lawyers and courts, to a plane where it would have the stamp of truth and authority. Not only this, such a method would largely do away with the waste of time and the great expense involved in trials where expert testimony is employed.

That the method suggested by Dr. Cohen is opportune and even likely to be carried out in a measure at an early day is shown by the fact that an attempt is now being made by the Massachusetts legislature " to pass a bill to regulate the employment of expert witnesses, to reduce the cost of expert testimony and to introduce official expert evidence by giving the courts authority in homicide cases to appoint one or more suitable and disinterested persons to investigate the issues and testify at the trial. This provision, however, does not prevent either the prosecution or the defense from producing other expert witnesses. The proposed measure provides that no expert witness shall be paid compensation for his services in excess of the ordinary witness fees provided by law, unless the court awards him a larger sum.

"The bill provides that no more than three experts shall be allowed to testify on either side, except in prosecutions for murder. The proposed legislation is not to apply to witnesses testifying to the 'established facts or deductions of science, nor to any other specific facts, but only to witnesses testifying to matters of opinion.' The bill seems to be aimed particularly at the hand-writing expert, whose testimony is necessarily an expression of opinion."

The question is a far-reaching one, not only concerning the public welfare and the legal profession, but also the status of the scientific expert and even of science itself ; for if supposedly scientific men can be found who render opinions diametrically opposed when there should be but one opinion or judgment on the same set of facts, what shall we say of the testimony of such men and of the sciences which they represent, or even of truth itself? It is high time that an effort be made to rescue the calling of the scientific expert from the grip of the sordid influences which surround it and to place it where it belongs, not only that the calling may not fall wholly into disrepute, but that the best interests of those it is intended to benefit may not suffer.

We are fortunate in having this subject presented at this time in the clear and convincing manner it is in Dr. Cohen's paper.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Pharmacal Jurisprudence. By Harley R. Wiley, A.B., LL.B. Hicks-Judd Company, San Francisco.

The author in his preface states that he was impelled to this collation of legal principles and cases relating to the legal status of pharmacy through an actual need for a treatise or collection of authorities as an aid to his work as a lecturer on the subject in the University of California.

The same need has been felt by all pharmacists actively engaged in attending to the interests of the profession in legislative matters as well as by lawyers having cases in which a clear understanding of the accepted relations of the profession of pharmacy to statute, case and constitutional law was necessary.

The opening chapter is a short but clear historical resumé of the evolution of the fundamental legal principles involved that is so lacking in the usual technical phraseology of legal text-books that the average pharmacist can read it with understanding, and, it might be added, will be benefited by doing so.

The author clearly affirms and vigorously sustains by logical argument the constitutionality of properly framed laws regulating the practice of pharmacy, and in addition cites judicial opinions from authorities of the highest standing in support of this view of the question.

There is a clear exposition of the border line between the practice of pharmacy and medicine that is drawn by the statutes relating to the two professions.

The chapter on contracts explains clearly the difference between the common law doctrine of "Caveat emptor," in which the purchaser relies upon his own judgment, and "Caveat venditor," in which the seller is warned to beware on the ground that he is the responsible party to the transaction on account of his special knowledge—thus explaining the principle that a pharmacist should and does guarantee to all who seek his services that he has the requisite scientific skill and knowledge.

The law of liability of the pharmacist in his relations with his patrons is clearly set forth in a special chapter, and in view of the increasing activity of Pure Food Commissions and State Boards of Pharmacy, it is a matter that will be profitably studied by any pharmacist.

The work is bound with an alphabetical table of cases that will prove useful to all lawyers having pharmaceutical clients.

Taken in its entirety as an example of industry in an untilled field, there is small reason for the modest plea of the author in the preface, "that those who examine its contents will do so with such indulgence as may seem due to the work as a pioneer in its peculiar field." W. L. CLIFFE.

TEXT-BOOK OF ORGANIC CHEMISTRY. By Henry Leffmann, A.M., M.D., and Charles H. LaWall, Ph.G. Philadelphia: P. Blakiston's Son & Co. 1904. Pp. 231.

This little book is stated in the preface to be offered as an aid to the study of organic chemistry in connection with general and professional courses.

The subject of organic chemistry, whether considered from the purely scientific side or from the points of view of its technical application and its bearing on medicine and pharmacy, has grown to such dimensions that it is a matter of difficulty to know what to select for discussion. Whether a book of such limited size shall endeavor merely to serve as an introduction to the understanding of the field, or whether it shall endeavor to give descriptions and details as to any considerable number of compounds, is the question for decision. Remsen's well-known little book on Organic Chemistry is specifically an introduction to the subject, and mentions a limited number of compounds, with little descriptive matter; this book devotes 48 pages to the principles of organic chemistry and 166 pages to descriptive chemistry.

The section on the principles is in general well stated, but, being put compactly together, before any illustrative account of special compounds appears, is liable to lead to an attempt at memorizing work so well known and deplored by the teacher of chemistry. Pages 47 and 48 are specially noted as likely to encourage this kind of study.

The descriptive section, beginning on page 49, is, however, very clearly and interestingly written and conveys much information of value to the medical or pharmaceutical student. The numbered experiments following each section are well chosen and very helpful to the student who will carry them through. Attention is called, for example, to the experiments on pages 110 and 111 following

the section on the carbohydrates as showing how helpful such practical tests can be made.

Some inaccuracies should be noted, which will, of course, be corrected in a future edition. On page 73, the formula of calcium carbonate, in the last line, wants the final figure 3; on page 99 the formula of dextrose should be $C_6H_{12}O_6$; on page 101 the graphic formula for the ketonic glycerose is incorrectly given; on page 130, in the third line from the bottom, "oxidation" should read "nitration;" on page 198 the formula of hypoxanthin has 1 oxygen atom too much.

We would also criticise the authors' choice of terms in several places. On pages 59 and 60 they speak of ethyl aldehyde, propyl aldehyde, butyl aldehyde and amyl aldehyde. The almost universal usage of organic chemists is to name the aldehyde by the name of the oxidized radical, making these acetaldehyde, propionaldehyde, butyraldehyde and valeraldehyde. On page 126 the authors use the rather unusual spelling "kreasote." The German word is "kreosot," and the English word used by Allen, the British Pharmacopœia and others is "creosote." And on page 146 the use of the term "methyl anilines" as a synonym for "toluidines" is an error which has inadvertently crept in. In methyl aniline the methyl has been introduced in the side chain, and not in the nucleus, as in toluidine.

The sections on the proteids and on ptomaines and leucomaines are both very interesting presentations of these important subjects.

The book is neatly gotten up and attractive in appearance.

S. P. Sadtler.

PHILADELPHIA COLLEGE OF PHARMACY.

The quarterly meeting of the Philadelphia College of Pharmacy was held December 27, 1904, at 4 o'clock P.M., in the Library. The inclement weather and the Christmas holidy prevented the usual attendance, but ten members being present.

The President, Howard B. French, presided. The minutes of the semi-annual meeting, held September 26, and of the special meeting (called to take action on the death of First Vice-President William J. Jenks) were read and approved.

The minutes of the Board of Trustees for September, October and November were read by the Registrar, and approved.

The resignations of Lyman F. Kebler and E. H. Cone, previously offered, were accepted.

A letter was read from Miss Lydia D. Jenks, daughter of the late William J. Jenks, on behalf of herself and brothers, expressing their deep sense of appreciation of the sentiments embodied in the engrossed resolutions recently received by them from the College.

ABSTRACT FROM THE MINUTES OF THE BOARD OF TRUSTEES—SEPTEMBER.

The Committee on Property reported having had the rewiring for the electric lighting done in accordance with the inspector's plans.

Also that additional cases had been built in the pharmaceutical laboratory, and that all the woodwork had been repainted and put in first-class condition.

The Committee on Library reported quite a number of accessions, both by gift and by purchase.

Jesse Conner Chisholm, P.D., Joshua Evans Eckman and Charles Dunning French, having complied with all the requirements, were granted certificates of Proficiency in Chemistry.

The Committee on Commencement reported having secured the Academy of Music for the evening of May 18, 1905, for the Commencement.

The statement was made that the late William Weightman had purchased the property at 112 North Eighteenth Street, and that satisfactory arrangements had been made to lease it to the Board of Governors of the College House Association.

A letter was read from A. B. Hammond, Secretary of the Board of Education of Philadelphia, thanking the Board of Trustees for the Scholarship offered to the pupils of the public schools.

OCTOBER.

Section 7, Article VIII, of the By-Laws was amended to read: "The fee for examination and conferring of any degree and diploma of the College shall be $15, payable but once. The fee for examination and conferring of the Certificate of Proficiency in Chemistry shall be $15, and the fee for granting a certificate for any special course not otherwise provided for shall be $5."

The Committee on Property reported everthing in good condition.

Mr. W. A. Rumsey reported for the Board of Governors of the College House that all the necessary alterations had been completed.

Fifty students were now in the House, and it was expected it would soon be full.

The Committee on Membership was announced, viz.: Henry Kraemer, W. A. Rumsey, H. L. Stiles, James T. Shinn and C. A. Weidemann.

Mr. W. L. Cliffe, on behalf of the State Board of Pharmacy, expressed their appreciation of courtesies extended by the Board of Trustees.

Mr. Irwin I. Peiffer was elected to active membership.

Professor Remington announced that through the liberality of Mrs. John R. Drexel, a granddaughter of Henry Troth, one of the founders of the College, there would be established another scholarship, to be called the Troth Scholarship.

NOVEMBER.

The Committee on Library reported a number of additions by purchase, and by donations from Henry N. Rittenhouse and C. D. Ritchie.

The President announced that Prof. Samuel P. Sadtler had now completed twenty-five years' service in the College.

The Committee on Scholarships reported having awarded nine scholarships, two being to pupils from the public schools.

Aubrey H. Weightman, Pierce A. Dietrich and Charles W. Parsons were elected to active membership.

C. A. Weidemann, M.D.,
Secretary.

PHARMACEUTICAL MEETING.

The Pharmaceutical Meeting in February will be held on Tuesday afternoon, the 14th, at 3 o'clock, in the Museum of the College.

Dr. H. W. Wiley, Chief of the Bureau of Chemistry of the United States Department of Agriculture, will give an address on "The Danger in the Use of Methyl Alcohol for Domestic Purposes."

Mahlon N. Kline, Chairman of the Committee on Legislation of the National Wholesale Druggists' Association, will read a paper on "Some Reasons why the Internal Revenue Tax on Alcohol should be Reduced, and why our Government should provide Free Denaturized Alcohol for Use in the Arts."

Prof. Samuel P. Sadtler will read a paper on "The Detection of Methyl Alcohol in Ethyl Alcohol."

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MARCH, 1905.

METHYL ALCOHOL—WHAT IS IT AND WHAT IS IT GOOD FOR?

By Dr. H. W. Wiley,
Chief of Bureau of Chemistry, United States Department of Agriculture.

When wood, especially hard wood, such as oak, hickory and beech, is heated in closed retorts to which oxygen does not have access, many products result. The volatile products are distilled and consist of wood tar, creosote, carbolic acid, acetic acid, acetone and methyl alcohol, all of which are solid or liquid bodies at ordinary temperature.

There are various gaseous products of distillation also produced, many of which are combustible. The mixed watery distillate which comes over is known as pyroligneous acid. It consists of water, acetic acid, methyl alcohol, acetone, etc. The first fraction obtained by distilling the crude pyroligneous acid is sometimes known as wood spirit, and with more or less purification is used largely as a denaturing agent for ordinary ethyl alcohol. The taste and odor of this product are so disagreeable as to prevent the utilization of the ethyl alcohol with which it is mixed for potable purposes. Methyl alcohol in a greater or less degree of purity can be secured from this mixture by diluting with water, which throws out some of the other liquid products which are then separated, and the residual alcohol is then redistilled over lime in a chambered or rectifying still. The spirit thus removed is filtered through charcoal to complete the rectification. Where a very concentrated methyl alcohol is to be secured, several redistillations are necessary. Acetone, although it has a lower boiling point than methyl alcohol, cannot be completely separated from the latter even by repeated distillation over lime.

In order to separate the acetone completely the mixture is treated with chloride of lime, whereby the acetone is converted into chloroform.

The chief gaseous products of distillation are hydrogen, methane, ethane, ethylene, carbon monoxide and carbon dioxide. Methyl alcohol has been said to occur in traces in the juice of some plants, and methyl salicylate is a well-known natural product commonly called oil of wintergreen. Pure methyl alcohol has a specific gravity at zero of 0.810 and boils at 66° C.

Owing to its having almost the same density as ethyl alcohol it is useless to try to distinguish between these two bodies or one of them in a mixture with the other by specific gravity alone. Although ethyl alcohol boils at 12° higher than methyl, it is very difficult to completely separate them by fractional distillation. Many of the methods of detecting methyl alcohol in mixtures, qualitatively, and of estimating it quantitatively, are very unsatisfactory and to a certain extent unreliable. There are one or two methods, however, which are reasonably satisfactory and which are as follows:

A simple color reaction for methyl alcohol is described in the *American Chemical Journal*, Vol. xxi, 1899, p. 266. This test depends upon the oxidation of methyl alcohol to formaldehyde, and the detection of the presence o the latter compound by the reaction with resorcin and sulphuric acid. This is a test which can be easily applied, and therefore I will give it in sufficient detail for ordinary purposes.

It is best that the solution to be examined should be previously distilled, but this is not always necessary. A spiral copper wire is heated to a bright red heat and plunged into a small quantity of the mixed alcohols to be examined. It is well, if the solution is dilute, to repeat this process several times. If the alcohol is concentrated it should be diluted before the application of the test. One drop of $\frac{1}{2}$ per cent. aqueous solution of resorcin is added and the mixture carefully poured into a test tube containing a few cubic centimeters of concentrated sulphuric acid. The presence of methyl alcohol is indicated by the production of a rose-red zone at the conjunction of the two liquids. Above this zone a scanty white or pinkish coagulum appears which finally separates and rises in purplish-red flecks.

The only compounds which give any reactions similar to the above described are the tertiary butyl alcohols, dimethyl-ethyl car-

binol, and formic acid. The succession of colors and the deportment of the flaky coloring matter finally produced are quite different, however, with these bodies as compared with those given by methyl alcohol.

The test with phloroglucin is made as follows: The oxidation of the methyl alcohol is carried on as described above. Acetaldehyde is removed by adding to the liquid remaining in the test tube 6 c.c. of a 3 per cent. solution of hydrogen peroxide, or an equivalent amount of hydrogen peroxide if in a different strength of solution. Mix the contents of the tube and filter into a porcelain dish. After three minutes add 2 c.c. of a 10 per cent. solution of sodium thiosulphate. Next add 3 c.c. of a phloroglucin solution obtained by dissolving 1 gramme of phloroglucin and 20 grammes of sodium hydroxide in water and making the volume to 100 c.c. A bright red coloration indicates the presence of methyl alcohol in the original sample. The intensity of the red color is in some degree proportionate to the quantity of methyl alcohol originally present. When carefully conducted, 1 part of methyl alcohol in 20 parts of ethyl alcohol can be detected by this reaction.

The purest forms of wood spirits are known by trade names as Columbian or Manhattan spirits. When perfectly pure, methyl alcohol is not unpleasant either to the taste or the smell, and it is much less toxic than the crude product which is so often used in denaturing spirits. It is more than probable that many of the toxic effects which have been reported as due to the use of wood alcohol have been produced by the impure or unrectified article. In fact, the pure article is so greatly increased in cost that it is not likely that its use will become very common. At the same time it must not be forgotten that wood alcohol is not subject to any internal revenue tax nor any restrictions, in so so far as I know, in manufacture or sale. For this reason its general distribution for almost any purpose would be facilitated. In view of the terrible indictment of methyl alcohol which has been summed up by Buller and Wood in the *Journal of the American Medical Association,* it seems only just to say that it is a substance which should be absolutely eliminated from any body or bodies which are taken internally or even applied externally as a remedy or otherwise.

Wood spirit undoubtedly has a large and legitimate use in the arts as a fuel and a solvent, and its manufacture and sale for such

purposes cannot be open to objection. It is true that any dangerous substance, even when manufactured solely for the arts, may be used in other ways to the great detriment or even death of the user. As a rule, however, in the case of wood alcohol the user himself is the culpable person, since he takes it either from an uncontrollable desire to drink or by accident which could be avoided by the exercise, on his part, of common discretion.

The addition of methyl alcohol, either pure or refined, to beverages or to medicine cannot be too severely condemned. I have spoken of the desirability of eliminating it from liquids applied externally, such as bay rum and others of the same class, and I think it is probable that the results of accident and experience are such as to warrant such exclusion.

All the alcohols are more or less poisonous, but the toxicity does not seem to be regularly connected with the place of the alcohol in the series. The two alcohols which are most common and occur in the greatest abundance are ethyl and methyl. Methyl is given the first place in the series, and ethyl the second. It is generally acknowledged that methyl alcohol is more toxic than ethyl, and yet the toxicity of ethyl alcohol is familiar to every one. Both methyl and ethyl alcohol appear to undergo, to a considerable extent, oxidation in the tissues of the body, but each of them before undergoing oxidation may pass into the circulation and produce toxic effects before nature has an opportunity to oxidize and remove it. Some of the higher alcohols are supposed to be more toxic than ethyl, just as methyl is supposed to be more toxic, but there is some doubt about the degree of toxicity of some of the higher alcohols, especially amyl alcohol. When quite pure it does not appear to have by any means the toxic properties which are exhibited by the crude article. All this leads to the belief that very often the toxicity of alcohols may be due to some aldehydic or other body formed with them, and from which it is difficult to separate them. In fact it is believed that the aldehydes which so generally accompany the alcohols and have such an intimate relation thereto are more toxic than their corresponding alcohols. This appears to be pre-eminently true in the case of methyl alcohol, for it is generally believed that formaldehyde is more toxic than the alcohol itself. The same is doubtless true of acetaldehyde, which is more toxic than ethyl alcohol.

For this reason the alcohols in the crude state, that is, as they are first formed and distilled, are more toxic than when they have been subjected to a process of purification. This point has already been brought out in the case of ethyl alcohol.

That well-known beverage, namely, whiskey, which consists largely of ethyl alcohol, is believed and in fact has been demonstrated to have far more toxicity when first distilled and when it probably has considerable quantities of aldehyde and furfurals and other bodies than it has after it has been stored in wood for several years and these compounds have had an opportunity to become oxidized into harmless and even beneficial ethereal compounds. The physician and pharmacist should not forget, however, that the alcohols as a rule are toxic, and doubtless some of them, like methyl alcohol, much more so than others, like ethyl alcohol. Their use, therefore, should be under careful supervision.

Whatever our opinion of the internal revenue laws may be, we must at least admit that in the careful supervision which they exercise over the manufacture of distilled spirits, they are highly beneficial from a hygienic point of view, since they give to the consumer accurate information relating to the materials used and the age of the product.

While it is not probable that the amount of money which could be raised by tax on the manufacture of wood alcohol would be a very considerable sum, it seems to me it would be the part of wisdom to lay a small tax on wood alcohol, both in its manufacture and subsequent sale, for the purpose of establishing over it the same legislative supervision which now attaches to the manufacture and sale of ethyl alcohol, and which supervision should extend, as it ought to extend in the case of ethyl alcohol, to all remedies and beverages made therefrom. It seems to me there can be no excuse for removing the restrictions in the trade from alcohol when anybody wants to use it and call it by a medical name. All medicines and remedies containing alcohol, which are not official, should be subjected to the same regulations in manufacture and sale as the corresponding quantity of alcohol sold as such.

The flooding of our country with various medicines in which alcohol constitutes the chief valuable constituent without control, without notification and without the knowledge of the consumer, is a practice that merits condemnation whether that alcohol be ethyl or

methyl. If it be methyl alcohol, the practice should receive an additional condemnation because of the greater toxicity of this compound.

THE ATTITUDE OF THE FRENCH GOVERNMENT TOWARDS METHYL ALCOHOL.

Article V, paragraph 1 of the law of the 16th of December, 1897, provides that there shall be considered from the fiscal point of view as assimilated to ethyl alcohol, methyl and other alcohols susceptible of being consumed as beverages either unmixed or mixed.

"The Consulting Committee of Arts and Manufacture shall determine which of these products by their degree of impurity or their specific characters should be considered as unfit for consumption, and to be exempt from excise or from denaturing.

In view of this authority the Consulting Committee of Arts and Manufactures, on the 14th of March, 1900, decided that, in order to be considered as unfit for consumption by the mouth, and free from the expense of excise and denaturing, methyl alcohols should contain at least 5 per cent. of acetone and 3 per cent. of pyrogenic impurities, which give to them a disagreeable empyreumatic odor. Under date of the 4th of January, 1905, the President of the Republic, through the Minister of Finance, Monsieur Rouvier, promulgated the following official decree:

Article I. The decision of the Consulting Committe of Arts and Manufactures of the day of the 14th of March, 1900, shall receive its full and entire execution.

Article II. The Minister of Finance is charged with the execution of the present decree, which will be inserted in the *Journal Officiel* and in the *Bulletin des Lois*.

THE DETECTION OF METHYL ALCOHOL IN LIQUIDS CONTAINING ETHYL ALCOHOL.

BY SAMUEL P. SADTLER, PH.D.

The increasing tendency to substitute methyl alcohol under some one of the trade names by which it is now known, for ethyl or grain alcohol, in the manufacture of tinctures, essences and other alcoholic preparations, makes the detection of such substitution or adultera-

tion a matter of importance both for the pharmaceutical chemist and the food analyst.

If we turn to standard books like "Allen's Commercial Organic Analysis" for the tests for methyl alcohol in the presence of ethyl alcohol we will find that the methods there found are far from being satisfactory in results or capable of entire dependence as to accuracy.

We find first several methods, such as those of Reynolds and of Cazeneuve, based upon the common presence of acetone as an impurity in methyl alcohol, so that its detection by inference leads the observer to draw conclusions as to the presence of methyl alcohol. This is a very unreliable and unsafe way of detecting the presence of methyl alcohol. Some of the deodorized and purified methyl alcohols on the market at present, like "Columbian Spirits," at times are nearly free from acetone, so that such methods can be dismissed from further consideration.

The method of Riche and Bardy, dependent on the formation of methyl iodide and from this methyl-aniline violet, is fairly reliable, but much too elaborate and involved to serve as a ready test. In this case the mixture of alcohols is distilled with iodine and red phosphorus when methyl and ethyl iodides are formed. These collect under the aqueous layer and are separated and transferred to a flask containing aniline with which they react readily. After an hour's time, the product is boiled with water and soda solution added when the bases rise to the top as an oily layer. This is drawn off and oxidized by the aid of cupric nitrate. The product of this oxidation, which takes some hours, is exhausted with warm alcohol and filtered when, if pure ethyl alcohol had been taken as the original sample, a red liquid is obtained, while if methyl alcohol had been present a violet shade is obtained. Still more conclusive results are obtained if the colored solution so obtained is used to dye a piece of white merino wool which takes up the violet color, but is not dyed in the absence of the methyl-aniline compound. This test is obviously too difficult of execution and too detailed to be available for ordinary pharmacopœial testing.

Still another test is given in Allen, viz., that of Miller. This is based on the fact that when oxidized with potassium dichromate and sulphuric acid, methyl alcohol produces formic acid, capable of reducing silver nitrate solution. However, pure ethyl alcohol when oxidized yields a trace of formic acid, or other reducing substance,

and so we cannot depend absolutely upon the result of the reducing test.

In 1899, Mulliken and Scudder published a method (*Am. Chem. Jour.*, 21, page 266), whereby a mixture of methyl and ethyl alcohol is oxidized in solution by the action of heated metallic copper, producing the corresponding aldehydes. Any formaldehyde so obtained is then recognized by characteristic color tests.

This method, in a somewhat modified and improved form, was brought out later by Dr. A. B. Prescott and by Leonard D. Haigh. (*Pharmaceutical Review* of October, 1903.)

In the form in which Dr. Prescott communicated it to the U. S. Pharmacopœia Revision Committee, it was as follows:

Test for Methyl Alcohol.—In a test-tube of the capacity of about 40 cm., take of the alcohol or spirit to be tested, if it be undiluted, 1 c.c. and add distilled water to make 10 c.c. in all. If the alcohol be judged to be already dilute take a correspondingly larger measure of it and dilute this to 10 c.c., so that the proportion of the alcohol shall not be more than 10 per cent. by volume in the liquid. A copper wire spiral (test reagent) is to be heated to redness in a flame free from soot, then plunged steadily quite to the bottom of the liquid in the test-tube and held there for a second or two, then withdrawn and dipped in water to cool. This treatment with red hot copper is to be repeated five or six times, immersing the test-tube in cold water to keep down the temperature of the liquid. The contents of the test-tube are now filtered into a wide test-tube and boiled very gently over the flame. If there be odor of acetaldehyde perceptible the boiling is to be continued until this odor nearly or quite ceases to be clearly distinguished. The liquid is now cooled, poured into a white porcelain dish with concave bottom, and lastly treated with the addition of five drops (or 1 c.c.) of phloroglucinol alkali solution (test reagent).

The color, if any, caused by the reagent should not be deeper than pale yellowish red, and should fade rapidly away.

(A deep red color persisting two or three minutes and longer, the reaction of formaldehyde, indicates methyl alcohol taken for the test. A pale or slight yellowish red color fading rapidly, the reaction of acetaldehyde, results when only ethyl alcohol is taken, the acetaldehyde produced by the treatment not being wholly driven off by the gentle boiling.)

Copper Wire Spiral.—Copper wire of size 18 is taken of the length of 1 meter. It is wound in a close spiral around a smooth rod 7 mm. thick to make a coil about 3 cm. long. A handle is made by twisting together the two free ends of the wire in the spiral, one of the ends having been overlapped in winding, beginning to wind at about 30 cm. from the end of the covered strand. The handle is left of sufficient length and is bent at right angles 6 cm. from the extremity, the horizontal part being wound with twine.

Phloroglucinol Test Solution.—Take of phloroglucinol 5 decigrammes; soda (white), 10 grammes; distilled water to make 50 c.c. Dissolve the phloroglucinol in about 40 c.c. of the distilled water with a little of the soda, then add the remainder of the soda, and enough distilled water to make the solution measure 50 c.c. A slight color in the fresh solution usually disappears on brief standing and may be disregarded. On long standing the solution darkens in color and should be rejected.

In Haigh's article the suggestion is also made that—

"The Rimini test may be used instead of the phloroglucinol test for the detection of formaldehyde after the oxidation of the alcohols. After the removal of the acetaldehyde by boiling, 1 c.c. of a dilute solution of phenylhydrazine hydrochloride is added, then a few drops of a fresh solution of sodium nitroprusside, and finally 1 c.c. of a 50 per cent. solution of sodium hydroxide. If formaldehyde is present a light blue or green color will result, depending upon the amount of methyl alcohol in the original spirit, and to some extent also on the care with which the boiling operation is conducted. The boiling of the liquid should not be carried too far and should be conducted as slowly as possible. In case the original spirit contained no methyl alcohol the resulting color of the solution will be a greenish yellow. Satisfactory results are obtained with both of these tests for quantities of methyl alcohol in spirits as small as one part to twenty parts of ethyl alcohol.

The Sub-committee of the U. S. Revision Committee then undertook a careful testing of this modified Mulliken and Scudder method and tested the several color reactions suggested to distinguish the formaldehyde. They found that the resorcinol test seemed more delicate than the phloroglucinol test and could be made to distinguish a smaller admixture of methyl alcohol than the other. In

addition the alkaline phloroglucinol test reagent does not keep as satisfactorily as the resorcinol solution, so that for the official test to be used in the forthcoming Pharmacopœia they have recommended the following. They believe that this can be carried out with uniform results by any careful experimenter, and it is relatively simple in its experimental details, as compared, for instance, with either the Riche and Bardy or even the Rimini test.

U. S. Pharmacopœia Methyl Alcohol Test.—Into a test-tube of about 40 c.c., 1 c.c. of the alcohol or spirit to be tested should be poured, and, if it be undiluted, enough distilled water added to make the liquid measure 10 c.c. If the alcohol be already diluted, a correspondingly larger volume of it should be taken and diluted to 10 c.c., so that the proportion of alcohol in the liquid shall not be more than about 10 per cent. by volume. A copper wire spiral (made by winding 1 meter of No. 18 clean copper wire closely around a glass rod 7 mm. thick, making a coil about 3 cm. long, the end of the wire being formed into a handle) should be heated to redness in a flame free from soot, and plunged steadily quite to the bottom of the liquid in the test-tube and held there for a second or two, then withdrawn and dipped into water to cool. This treatment with red-hot copper should be repeated five or six times, immersing the test-tube in cold water to keep down the temperature of the liquid. The contents of the test-tube should now be filtered into a wide test-tube and boiled very gently. If the odor of acetaldehyde be perceptible, the boiling is to be continued until the odor ceases to be distinguished clearly. The liquid is now cooled, and to it should be added 1 drop of a solution containing 1 part of resorcinol in 200 parts of water. A portion of this liquid is then poured cautiously into a second tube containing pure sulphuric acid, in such a way that the two liquids shall not mix, the tube being held in an inclined position; this tube is allowed to stand for three minutes, and then slowly rotated. No rose-red ring should show at the line of contact of the two layers (absence of more than 2 per cent. of methyl alcohol).

SOME REASONS WHY THE INTERNAL REVENUE TAX ON ALCOHOL SHOULD BE REDUCED, AND WHY OUR GOVERNMENT SHOULD PROVIDE FREE DENATURIZED ALCOHOL FOR USE IN THE ARTS.

By Mahlon N. Kline.

No legislation pending in Congress is more important or promises to be more far-reaching in its results than the proposed legislation affecting the duty on alcohol. The commercial world (and especially that part of it in which manufacturing chemists or pharmaceutical manufacturers, large and small, are embraced) has scarcely grasped the magnitude of the results that would follow the enactment into laws of the legislation proposed in the bills introduced by Hon. H. S. Boutell, of Illinois—H. R. 9302, providing for the use, free of tax, of alcohol which has been rendered unfit for drinking purposes by the admixture of some noxious substance, and H. R. 9303, reducing the internal revenue tax on distilled spirits, and H. R. 9051, introduced by the Hon. Wm. C. Lovering, of Massachusetts, providing for the refund of the tax paid on domestic alcohol used in the manufacture of exported articles. No other legislation now suggested in the public interest can be compared with these propositions in their effect in creating new industries, developing those already in existence and greatly increasing our domestic and foreign trade.

The necessity for the legislation proposed in the first of these bills is found in the fact that our internal revenue laws, under which a tax of $1.10 per proof gallon is levied on all distilled spirit, make no distinction between the distilled spirits used as a beverage and that used for industrial purposes. In the latter form distilled spirits, generally called alcohol, are a necessary material in thousands of important industries. The use of alcohol for manufacturing purposes is much more extensive than is commonly supposed, since, in addition to the industries producing articles in which alcohol remains in the finished product, there are many articles in the manufacture of which alcohol is used, though they contain no trace of that material.

As commercial alcohol is usually of 188° or 190° proof (that is 94 or 95 per cent. pure alcohol) the tax of $1.10 per proof gallon is equivalent to a tax of about $2.07 per gallon of industrial alcohol,

or nearly 1,000 per cent. of the original cost of the alcohol as distilled. The effect of a tax of this kind on a material used in manufacturing many important articles of general consumption is so evidently oppressive on productive industry that practically every commercial and manufacturing country in the world, except the United States, makes a distinction between alcohol used for industrial purposes and that used as a beverage. In Germany, France, Great Britain, Austria, Russia, Holland, Denmark, Norway, Sweden, Switzerland and Italy, and several smaller countries, no tax is imposed on alcohol which has been rendered unfit for drinking purposes, or, as it is commonly called, "denaturized alcohol."

This policy of exempting industrial alcohol from taxation has been in force in these countries for varying periods, in some cases for more than twenty years, and in every case the advantages resulting from it have been found so great that the tendency everywhere has been to broaden the scope of the laws relating to this subject. In no instance has a country which has once adopted such a policy gone back to the old system of taxing alike beverage and industrial alcohol.

Notwithstanding the fact that the most important of these European countries have very costly military and naval establishments to sustain, which are a very heavy strain on their revenue resources, and which necessitate many special forms of taxation to which the American people would not submit, no suggestion is ever made of levying internal revenue taxes on alcohol used for industrial purposes.

The most notable example of the benefits conferred by freeing from taxation alcohol used in the arts and manufactures, is found in the experience of Germany. That country in 1887 enacted a law greatly extending the system of untaxed denaturized alcohol which had previously been in force, and encouraging the production and general use of alcohol for industrial purposes. The results of this more liberal policy have been of great benefit, both to the farming and manufacturing interests.

The German farmer has been benefited by cheap untaxed alcohol in two ways: (1) Through a great additional market for his potatoes, of which enormous crops are annually grown for making alcohol; and (2) through the use of alcohol for light, heating purposes and as a fuel for motor engines running all kinds of farm

machinery. The farmers have also benefited by this policy making possible the development of new industries employing many thousands of workmen, who consume large quantities of German farm products.

Germany's manufacturing industries in the many lines in which alcohol is used have been enormously stimulated by the very low price (the present cost, according to Consul-General Mason's report, being from 15 to 18 cents per gallon) at which it can be procured. With the advantage of a cheap and abundant supply of this important material the German manufacturers in these lines have developed their industries so that they are now the foremost in the world, and have secured almost the entire export trade to neutral markets.

Among these articles are the products of the great chemical industries, the coal-tar colors, lacquers, dyes, varnishes, perfumery, etc., etc. Not only does Germany practically control the trade of neutral markets in all the various chemical products, but she also sells large quantities of these articles in this country, the advantage resulting from cheap alcohol being sufficient to enable them to be sold here in spite of our protective tariff. The effect of our exorbitant internal revenue tax on alcohol has, therefore, been to encourage the sale in this country of foreign production, instead of domestic origin.

The effect of the German law of 1887 in stimulating the consumption of untaxed alcohol is shown by the following table:

Year Ending Oct. 1st.	Amount Proof Gallons.
1888	20,476,768
1889	22,786,987
1890	28,074,667
1891	27,426,341
1892	29,127,384
1893	32,052,803
1894	35,102,593
1895	37,977,396
1896	42,694,947
1897	45,818,132
1898	46,979,841
1899	52,290,000
1900	55,098,285
1901	61,053,000
1902	58,632,840

In addition to this enormous amount of untaxed alcohol, Germany

consumes for industrial purposes an almost equally large amount of tax-paid alcohol. Owing to the low tax-rate in force in that country (about 40 cents per proof gallon) the industries requiring pure ethyl alcohol have been so extensively developed that the estimated annual consumption of tax-paid alcohol is about 55,000,000 proof gallons annually. While no statistics giving the actual consumption of the tax-paid product for these purposes are obtainable, this estimate is reached by deducting from the total average amount on which taxes are paid an average annual consumption for beverage purposes equal to the proportionate consumption for this purpose in the United States. As it is well known the Germans are a beer- and wine-drinking people, it is highly improbable that they also drink as much distilled spirits as the people of this country, so that the estimate of the consumption in Germany for beverage purposes is probably too large. In any event there is shown to be a consumption of tax-paid alcohol in the arts of over 50,000,000 gallons per year, making, with the consumption of untaxed denaturized alcohol, an annual total of more than 100,000,000 gallons of alcohol.

In sharp contrast with this immense quantity is the consumption of alcohol in the United States. There is, of course, no consumption of untaxed denaturized alcohol, owing to the failure of our laws to make provision for such use. Of tax-paid alcohol it is estimated that less than 5,000,000 gallons are annually used in the arts, the excessive tax of $2.07 making its use prohibitive, except where it is absolutely necessary in the manufacture of articles such as flavoring extracts, perfumery, pharmaceuticals, medicines, etc. Even in these industries the consumption is very much smaller than in Germany, as the high cost of the alcohol greatly increases the selling price of the goods into which it enters, and therefore decreases their sale.

Another reason for the small consumption of tax-paid alcohol is found in the general use of inferior untaxed substitutes, chiefly refined wood alcohol, which, notwithstanding its injurious qualities that render it dangerous to health, is being largely substituted for pure grain alcohol. The extent to which this substitution is carried on is notorious, and the health officials throughout the country are taking active measures to punish the manufacturers of preparations in which wood alcohol is unlawfully used.

In a paper on "Poisoning by Wood Alcohol," by Drs. Frank Buller and Casey A. Wood, recently published in the *Journal of the*

American Medical Association, attention is called to the increasing use of wood alcohol, particularly of the highly refined varieties, in the manufacture of Jamaica ginger, flavoring extracts, bay rum, essences, witch hazel, etc., in all of which its presence is highly injurious, and in those preparations intended for internal use, positively dangerous to life. A number of instances in which death resulted from the improper use of wood alcohol are given, and many cases of blindness and other diseases are cited as having been due to this dangerous substitution.

For these various reasons the annual consumption of ethyl alcohol in this country is some 95,000,000 proof gallons less than in Germany. As the population of the latter country is only about two-thirds of that of the United States, this showing is even worse than these figures would indicate. With a per capita consumption in this country equal to that of Germany, we should be using 150,000,000 gallons per year, instead of 5,000,000 gallons as at present.

Some of the purposes for which this immense quantity of alcohol would be used are shown in the statement given above of the consumption of untaxed alcohol in Germany. But in addition to these various uses there are thousands of important industries in this country which would greatly prefer to use it instead of the inferior substitutes, and which would consume many millions of gallons annually. Cheap alcohol would also make possible the establishment of many new industries for the production of articles not now made in this country, and thus give employment to American workmen in making articles now bought from foreign countries. It would also enable our manufacturers to develop an export trade in many lines from which they are now entirely shut out through their inability to sell their goods in competition with those of countries where alcohol is obtained free of tax. The total consumption for these purposes would be very large.

As an illustration I may refer to the manufacture of artificial silk, a material which is found to be an entirely satisfactory substitute for the product of the silk worm for many purposes, and which is extensively manufactured and used in European countries. This silk is manufactured from nitro-cellulose by a process which involves the use of 2 pounds of alcohol converted into ether for each pound of silk produced. Under our present laws the high price of alcohol

effectually prevents its use for this purpose, and in consequence none of this material is manufactured here. I am informed that a French company, operating under the Chardonnet process for making artificial silk, is ready to establish a factory in this country in which at least 1,000 workers would be employed, provided they can secure untaxed alcohol. This company alone would consume more than 1,000,000 gallons of alcohol annually, as well as large quantities of raw cotton, from which the nitro-cellulose is made. Another purpose for which alcohol would be largely used would be as an extractive agent for the separation of stearic acid. This substance, commonly known as oleo-stearine, is extensively used in the manufacture of lard compounds, and for various other purposes. At present it is extracted in this country by hydraulic presses, but its production by the alcohol process gives larger results. This process cannot, however, be utilized with alcohol at its present price. but with untaxed alcohol it would be generally used for this purpose.

It is, however, in the use of alcohol as a motor fuel, and for lighting, heating, cleansing and similar purposes that the greatest consumption of alcohol would take place. The possibilities for its use for all these purposes are very great, and it is certain that with the tax removed the low price at which denaturized alcohol would be sold would ensure its general consumption on an enormous scale.

Alcohol is not only a decidedly satisfactory substitute for gasoline as a motor fuel, but it is superior in many important particulars. It is clean, odorless and free from danger of accidental explosion. There is absolutely no reason why it could not be successfully used in this country as a fuel for automobiles, powerboats and launches, and stationary motors for running farm- and other kinds of machinery. The removal of the tax would therefore furnish an unlimited supply of a safe and economical power fuel, and would permit the consumption for this purpose alone of immense quantities.

Alcohol is also an excellent illuminating material, and when burned in lamps using incandescent burners, furnishes a soft, steady white light at a cost per candle-power less than that of kerosene oil. This has been demonstrated in Germany, millions of gallons being annually used in that country for lighting purposes. In addition to its low cost other advantages of alcohol for lighting purposes

are its cleanliness, freedom from danger of explosion and lack of disagreeable odor. It would undoubtedly be extensively used in this country as an illuminant if the tax were removed.

For heating and cooking, alcohol is unquestionably safer, cleaner and more agreeable to use than gasoline, and would preferably be used in millions of households for these purposes if it were furnished at the same price as that material. Small portable alcohol stoves giving out sufficient heat to thoroughly warm a large room are in general use in Germany, and it is estimated that the alcohol used for heating is as economical as anthracite coal at $6 per ton. The adoption of a system of untaxed denaturized alcohol would make the use of alcohol as a fuel for heating purposes entirely practicable, and would be of especial advantage to those large sections of the country where coal and wood are scarce.

It is in the manufacture of the organic chemicals that the greatest field for new industries would be created by legislation giving cheap alcohol. This is practically the only line in which the United States falls far behind foreign nations, and our failure to develop this important group of industries is almost entirely due to the high price of commercial alcohol. We import annually about $10,000,000 worth of fine chemicals, drugs, coal-tar colors, dyes, etc., chiefly from Germany, almost all of which could be, and would be, manufactured here under alcohol laws as liberal as those of the countries from which these articles are imported.

The greatest advantage which cheap alcohol gives foreign manufacturers of these products can, perhaps, be better shown by a comparison of the exports of fine chemicals from one country, Germany, with the total production of the United States. While the value of the artificial dyes annually made in this country is only about $2,500,000, Germany exports each year more than $30,000,000 worth of these products. The annual production of fine chemicals, drugs, etc., manufactured in this country is valued at less than $5,000,000. The value of these articles annually exported by Germany exceeds $50,000,000. Thus on these two lines of products, in which the advantage of the German manufacturers over those of this country is almost entirely due to cheapness of alcohol in Germany, the value of our total production is exceeded by more than $70,000,000 by the German export trade alone. In view of these remarkable facts it is fair to assume that with our abundant capital,

skilled workmen, and great consuming power, the production of all kinds of articles in the manufacture of which alcohol is a necessary material, would, under conditions as favorable as those of foreign countries, be increased ten-fold.

While an untaxed denaturized alcohol law would thus greatly benefit our manufacturers, farmers, and workers generally, there is a most important class of industries which would receive no advantage from it. These are the industries requiring pure ethyl alcohol for manufacturing such products as flavoring extracts, pharmaceuticals, drugs, perfumery and various other articles. To meet the requirements of these industries for cheaper alcohol it is proposed to reduce the tax on distilled spirits to 70 cents per proof gallon, which would effect a reduction of about 75 cents per gallon in the cost of commercial alcohol. This would give the manufacturers pure grain alcohol at a reasonable price, and would greatly stimulate the consumption of all kinds of articles in which it is used.

To compensate for any loss of revenue that might result from the reduction in the tax rate it is proposed to levy an additional tax of 40 cents per proof gallon on all rectified, compounded or blended spirits. This would yield an annual revenue of $3,000,000 or $35,000,000, which would all be paid by the users of distilled spirits as a beverage.

A precedent for the imposition of this additional tax is found in our revenue laws for the Philippines, which provide for a special tax on all rectified or blended distilled liquors. It is also instructive to note that provision has been made by these laws for a very low tax rate on denaturized alcohol for industrial purposes.

H. R. 9051, the third measure to which I have referred, is one of particular interest to our export trade. While alcohol in the original tax-paid packages may be exported free of tax, no provision is made for refunding the internal revenue tax on alcohol exported as a component part of manufactured articles. Since all other commercial countries give their manufacturers tax-free alcohol for the export trade, the failure of our laws to make a similar provision has effectually prevented our manufacturers from competing in these lines with their foreign rivals or the world's trade. The enactment of the Lovering Bill would open up to our manufacturers of all kinds of articles in which alcohol is a material new and valuable markets, and enable them to secure their fair share of the world's trade.

With the enactment of the legislation provided for in these bills the important group of alcohol-using industries will be placed on an equal footing with those of foreign countries; manufacturers will find an increased demand for their products, and the consuming public will obtain better goods at lower prices.

I hope that careful consideration will be given to the facts referred to in this paper, and that all the branches of the chemical and drug trades will give these bills their continued and active support in view of the far-reaching results, as outlined in this paper, which would follow the passage of these alcohol bills.

THE USE OF METHYL ALCOHOL AND THE REDUCTION OF THE INTERNAL REVENUE TAX ON ALCOHOL.

The Pharmaceutical Meeting, held on Tuesday afternoon, February 14th, was devoted for the most part to the consideration of the questions of the use of methyl alcohol and the desirability of the Government reducing the internal revenue tax on ethyl alcohol, and providing a free denaturized alcohol for use in the arts. The papers which were read at this meeting are published elsewhere in this issue, and some of the letters which were received and read at the meeting, as well as some of the remarks made, follow.

DR. A. R. L. DOHME

wrote as follows:

There can be no doubt that it would serve the Government, the general public as well as the manufacturer, better if the internal revenue tax upon grain alcohol were reduced to 70 cents a proof gallon as proposed, for in that event the government revenue from alcohol would undoubtedly be increased and the incentive for the substitution of the dangerous wood alcohol in the arts and in beverages especially would be eliminated. There exists no longer any doubt that methyl alcohol, pure or impure, is a poison when taken internally, due to the excellent investigations of my friend Dr. Reid Hunt, formerly of our staff at the Johns Hopkins Medical School, and now of the Government service at Washington. It was my opinion, before Dr. Hunt's paper was read at a meeting of the Mary-

land Pharmaceutical Association, that the poisonous nature of wood alcohol was not due to the methyl alcohol it contained, but to its impurities, especially the amines. While these amines may still add to the poisonous nature of the wood alcohol, the fact that the methyl alcohol it contains is itself poisonous makes its use for internal administration impossible, in fact criminal. There are, of course, uses that it can and will be put to in the arts, such as varnishes, inks, chromo-lithographic work, hat manufacturing, etc., etc., because of its cheapness and the fact that it never can be taken internally. The main question before us now is whether it can safely be used for the extraction of drugs or the preparation of liniments or tinctures intended for external use only. My opinion is that it should not be used for tinctures or liniments because they may be at times used for internal use, and the wood alcohol may also be absorbed through the skin when used externally. As to its use for extracting drugs, I would say that while its use is not advisable, I really see no absolute danger connected with it, provided this extraction is made only in those instances in which all the menstruum is evaporated off at temperatures that preclude the possibility of any of it being retained in the extract remaining. Thus, in case of the preparation of extract of stramonium, the drug could be exhausted with it, and the resulting fluid extract evaporated to a pilular consistency on a water bath with careful stirring without any trace of the methyl alcohol or any of its impurities being retained in the resulting extract. However, despite this possibly safe method of extracting drugs for making their solid extracts, I personally am not in favor of its use and would not advise its use in this way to any one, because of the possible danger of all of the methyl alcohol not being eliminated, due to the lack of care on the part of the operator. If a substance is a poison, as is methyl alcohol, it is always safest and advisable to eliminate it from the armamentarium of the pharmacist, be he retailer, wholesaler or manufacturer. The temptation to save some money will, however, most probably always tempt some people to use it when they know they cannot be held criminally liable for doing so, and because this is true I sincerely trust that Congress will grant the reduction in the tax on ethyl alcohol, and thus largely eliminate this excuse for the use of wood alcohol for any purpose connected in any way with medicine or pharmacy. In Europe wood alcohol is used largely in the exhaustion of drugs for the manufacture of

alkaloids, but in this case there can be no danger, since the resulting product is crystalline and is always purified by recrystallization sufficiently to make it impossible for any to be carried over to the final product. Besides this the alkaloids are so much more toxic than the wood alcohol, even if any were carried over, that in the doses in which the alkaloids are administered, no undesirable effects could possibly be produced.

DR. HENRY W. CATTELL

said:

From my own experience I would state definitely that it is now a rare thing for the chemist to find methyl alcohol in medicines, flavoring extracts, tincture of iodin, and the better-known makes of witch hazel. The reason for this is twofold: (1) the honest manufacturer, ignorant, as we all were until a few years ago, of the dangerous qualities lurking in methyl alcohol, immediately discontinued its use in his preparations upon learning of the toxic effects of wood alcohol; (2) dishonest manufacturers—and I am glad to say that these form but a small minority—have found to their cost that methyl alcohol can be so easily detected by the present delicate tests at our command that they cannot hide the fact that they are using this preparation. As an example, I would cite the statement of the Dairy and Food Commissioner of Michigan in *Report 112*, issued a few weeks ago, that no flavoring extracts in Michigan are now found after an extended search to contain methyl alcohol, owing to the conviction of a certain party who had used 95 per cent. wood alcohol in his preparations, and to the subsequent destruction of some $8,000 worth of his stock.

In discussing this question one must remember that a person who has once experienced the effects of methyl alcohol may enjoy this form of intoxication more than that from ethyl alcohol. There seems to be the greatest variation in the disposition of the individual towards methyl alcohol, some being able to take large quantities of it over a long period of time without any serious effects even upon the eyes. In several cases which have come under my notice among sailors and others, the methyl alcohol was specifically asked for in order to make the punch stronger. It will thus be seen that if the person desires to secure methyl alcohol for this purpose, he will undoubtedly do so—just as boys steal gasolene

from the street-lamps and suck cologne from the penny-in-the-slot machine—but I cannot substantiate the statement recently made by the Dairy and Food Commissioner of Pennsylvania that methyl alcohol is a common adulterant of the cheaper grades of whiskies.

I learn with regret that the test for methyl alcohol to be employed in the new pharmacopœia will distinguish but 2 per cent. of methyl alcohol in ethyl alcohol, resorcinol being more delicate for the final test than phloroglucinol. If the quantity of substance at hand is large, fractional distillation will reduce the delicacy of this test many fold. There is one peculiarity in testing formaldehyde that it may be well to call attention to, namely, that the iron test seems to be much more delicate when performed in milk than under other conditions. In a U. S. Bulletin, just issued, the Association of Agricultural Chemists recommends that the following methods for discovering the presence of formaldehyde be given trial. These tests are easy of application, and are specially suited to the detection of this widely-used preservative in milk. To familiarize oneself with Rimini's method take 15 c.c. of a very dilute formaldehyde solution, and treat with 1 c.c. of a dilute solution of phenylhydrazin hydrochlorid, then with a few drops of freshly-prepared sodium nitroprussid solution, and finally with concentrated caustic soda solution. A blue color is formed, which, after a long time, changes to red. This reaction is capable of indicating formaldehyde in milk, even in a dilution of 1 in 30,000. Ferric chlorid may be used instead of the sodium nitroprussid, to be followed by a concentrated hydrochloric acid, in place of the caustic soda. By so doing a red color, which changes after some time to orange yellow, will show itself in the presence of formaldehyde. With meats and fats the formaldehyde should first be extracted with alcohol and the filtrate tested. Milk may also be shaken with an equal volume of absolute alcohol, and the filtrate tested. When the reagents are applied to dark beers the coloration may be determined by the color of the froth, just as one can do in the case of the diazo reaction in urine. In Rideal's test (*Analyst*, 1895), 100 c.c. of milk, suspected to contain formaldehyde, is distilled, and Schiff's reagent (a colorless solution of fuchsin and sodium sulphite) is added thereto, a violet red color denotes formaldehyde. Seligmann (*Zeitschr. f. Hyg. u. Infectionskrankh.*, Vol. XIL, No. 2, p. 325, 1905) detects 1–40,000 parts of formaldehyde in milk, as fol-

lows: Several drops of a weak sulphuric-acid solution are added to 5 c.c. of milk and weak Schiff's reagent is added. A reddish violet ring shows the presence of formaldehyde.

My own work with methyl alcohol has been largely upon the question as to whether or not methyl alcohol *per se* is poisonous. And granting this to be the case—as the evidence would seem to show—whether or not the methyl radical is toxic, and, if so, what preparations into which it enters may be harmful medicinally? It would seem that methyl alcohol when introduced into the system is but slowly eliminated, and that it is converted into formic acid and formaldehyde. Like arsenic, methyl alcohol and formic acid are excreted by the glands of the stomach even when introduced into the body in other channels than by the mouth, so that we have a double toxic effect of the drug upon the alimentary canal. This might even be used as a physiologic test for the detection of the presence of methyl alcohol. The theory as to ethyl alcohol being produced by the metabolic processes in the human body is again coming into prominence, and while methyl alcohol has not been discovered in nature, it may be owing to the same difficulty which physiologists have encountered in their endeavor to show that ethyl alcohol exists normally in the body.

THE SIZE OF THE DROPPER AS APPLIED TO EYE DROPS CONTAINING ALKALOIDS.

By Dr. P. N. K. Schwenk,
An Attending Surgeon to Wills Eye Hospital and Eye Department of Pennsylvania Hospital.

There are many drugs,[1] mostly in the form of alkaloids or their salts, which, when applied to the eye, have the power of producing dilatation of the pupil (*mydriasis*), and hence called *mydriatics*, while others[2] have the effect of diminishing the size of the pupil (*i. e.*, of producing *myosis*), and hence called *myotics*.

Since most of these medicines are poisonous when given in excess, great care must be exercised not to apply them too freely, *i. e.*, within the prescribed dictation of the physician or oculist who prescribes.

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[1] Atropine, homatropine, daturine, duboisine, hyoscyamine, scopalamine, ephedrin, mydrin, gelsemine, cocaine, etc.

[2] Eserine, pilocarpine, etc.

Mydriatics and myotics are usually prescribed in aqueous solutions and applied into the conjunctival sac of the eye by means of an eye-dropper. If the quantity so applied is in excess of what the conjunctival surfaces will absorb or imbibe, this excess will find its way with the tears through the canaliculi into the nose and thence into the mucous membranes of the upper air passages, from whence it is absorbed into the circulatory system. In this way you will find not a few patients return to your office much depressed and having more or less the effects of acute poisoning. If you investigate how this condition was brought about you will discover that the patient received a dropper supplying more of the drug than you intended, or in excess of physiological limits.

It is because of this condition that I have consented to again call your attention to the size of the dropper used in administering solutions containing alkaloids into the eye. Much has already been written on this subject, but from personal observation little practical attention has been given to this matter by the pharmacist compounding eye preparations.

In the American Journal of Pharmacy for August, 1902, you will find an able and exhaustive article on "Drops as Dose Measure," by Mr. M. I. Wilbert, Ph.M., Pharmacist to German Hospital, with a long bibliography on the subject. Mr. Wilbert suggests that one drop of water should be regarded to be equal to one-twentieth part of a gramme. If this system could be made effective and droppers made to measure the indicated quantity, it would be a ready method of calculation, and also quite practical. But as this has not been adopted we still have to contend with the droppers as they exist. There is little doubt but that all oculists accept one minim as the unit of measure, and that one drop to be its equivalent, they intend that the pharmacist will give an eye-dropper that will drop only that quantity.

From the variety of eye-droppers which I here present, you will observe that every druggist has an idea of his own as to what shall constitute one drop. It is because of this irregularity in sizes and shapes that the attention of the compounding pharmacist should be awakened to the necessity of carrying out the intentions of the prescriber, thereby avoiding often much inconvenience to the patient.

From a number of trials I have found that the straight dropper

whose tip or point having a diameter of 2·00 to 3·50 mm. will most nearly drop 60 drops of an aqueous solution to the drachm. This allows an inclination of the dropper of 45° to the horizon. A drop always bears a direct ratio in size to the surface from which it drops, so that in a curved dropper the solution follows the curve to the point of rest and gives rise to a larger drop than if dropped from the point. The same is true of beaded droppers.

Curved and beaded droppers should never be given to drop solutions containing poisonous alkaloids, as they always give a surface having a diameter of over 2·50 mm., and therefore drop more than one drop or one minim.

Another point, eye droppers having the dark rubber nipples are far superior to those having red or white nipples, because the former are less sensitive or delicate to the touch. The rubber nipples should always be cleansed to rid them of rubber dust or sulphur contained therein. So then the dropper having a straight tip 2·00 to 3·50 mm. in diameter with a black or dark rubber nipple is the one to prescribe with alkaloid solutions.

THE DESIRABILITY OF A STANDARD EYE DROPPER.

After the reading of Dr. Schwenk's paper on "The Size of the Dropper as Applied to Alkaloids in Eye Drops" at the Pharmaceutical Meeting on January 10th, the following remarks were made:

DR. WENDELL REBER

said:

"I quite agree with Dr. Schwenk as to the desirability of having a standard dropper, if that were practicable. Unfortunately that does not yet seem feasible. What with solutions varying from *alcoholic* to *viscid* in character and of all grades of specific gravity, it does not seem now possible to bring either the public or the pharmacist to the point that they will be willing to take the trouble to discriminate between droppers for aqueous and those for other liquids. For a numbers of years I have felt the need of protecting the public against the poisonous effects of the powerful drugs used in eye work that may result from the use of droppers with too large an aperture. So far it has been possible to avoid this by resorting to a simple practical measure. It is my invariable rule in hospital or

private work to caution the patient to make pressure with a soft handkerchief just over the inner corners of both eyes, where are located the tops of the tear ducts. In this way any excess solution is immediately absorbed by the handkerchief and is prevented from running down the tear canal into the nose, there to be absorbed into the general circulation. In this connection it is well to remember that the mucous membrane of the nose is twice as absorptive as that of the stomach, so that the entrance of $\frac{1}{100}$ of a grain of an alkaloid there would be equal to the entrance of $\frac{1}{50}$ of a grain by the stomach.

"As to sterilizing solutions, whether in droppers or in bottles, it must be borne in mind that many of the alkaloids used in ophthalmic work are very delicate in nature and may be split up into different compounds by boiling. Cocain, for instance, loses much of its anesthetizing power by boiling. I recall a man upon whom I operated for cataract. I could not understand why he was so unruly during the operation. He seemed to experience very much more pain than most such patients. Two weeks later while operating on another cataract patient, I used a boiled cocain solution in the way that we commonly use cocain, and at the end of fifteen minutes began the operation. His sensitiveness was so great that I stopped, and used three instillations of a similar strength cocain solution that had not been boiled. Within ten minutes the eye was absolutely insensitive, and the cataract was removed without the slightest twinge of pain. This observation I have repeatedly confirmed, and I am convinced that while the special anæsthetic properties of cocain are not entirely destroyed by boiling, they are so reduced that the boiled solution becomes practically worthless. The best way to prepare the solution to be used for such purposes is to boil a saturated boracic acid solution, and when it has cooled to about 98° or 99° F., to dissolve in it such amount of cocain as the surgeon may desire. Even if an absolutely sterile cocain solution might be obtained, it would not be worth while taking the trouble, as there are no eye-lids absolutely free from bacteria. Eyre, and also Arnold Lawson, of London, examined the inner surface of the lids of fifty normal eyes in healthy persons, and found three to five different kinds of bacteria of varying virulence in all but two or three. Gifford, Omaha, Neb. (one of our foremost bacteriologists in ophthalmic science), scrubbed the

outer and inner surface of the lids with a boracic acid solution and afterward flushed the eyes with a warm boracic acid solution, and, in spite of all this care, was not able to secure an eye free from micro-organisms.

And yet this last statement should in no wise deter us from approaching as close to absolute cleanliness as possible in all that is done about the eye. Droppers should be thoroughly rinsed each time before using. The eye or eyes should be thoroughly flushed with warm boracic acid solution, and any and all instruments boiled (excepting those with sharp cutting edges which should be immersed for half an hour in absolute alcohol) before introducing them into the eye. If we cannot make the eye sterile we can at least make the instruments and eyes as clean as possible. Experimental bacteriology has proven that when the number of bacteria is reduced below a certain quantity and the soil made uncongenial, there is little, if any, danger of infection, hence the imperative need for simple absolute cleanliness.

M. I. WILBERT

said:

"The International Conference for the Unification of the Formulæ of Potent Medicaments, held at Brussels, Belgium, in 1902, recommended the adoption of a normal drop counter, having an external dropping surface of 3 millimetres, and dropping, at 15° C., drops that will weigh 0·05, or the equivalent of one-twentieth of 1 c.c.

This recommendation has been officially adopted by every country represented at the conference, with the exception of Germany and the United States, and will, no doubt, go far towards correcting the various existing ideas regarding drops. For general use, as dose measures, even the universal adoption of this standard drop and dropper will not overcome the inherent tendency to alter the size of the dropping surface, and with it the size of the drop, by changing the angle at which the dropping device is held. One other serious defect with even the best of our generally used pipette droppers is the difficulty of instilling one or two drops into the eye, without causing an accidental deluge of drops to inundate the eye, and causing the unexpected untoward effects referred to by the doctor in his paper. The Germans have overcome this latter

tendency, and have also partially overcome the former by dispensing potent eye drops in special containers. These consist of a small vial having a perforated stopper, through which is introduced a corrugated or twisted glass rod that answers as the dropping device. The evident advantages of this device are that the glass rod does not hold more than two, or at the most three drops at a time, that the drops form and disengage slowly, and are in addition to this but slightly effected by any unavoidable jar or tremor. Among other advantages that might be claimed for this device are the fact that it may be readily sterilized, and that there is less likelihood of there being a marked change in the strength of the solution, caused by the evaporation of a portion ot the solvent remaining in, or on, the pipette or dropper.

CAMPHOR SNOW AND MILK OF CAMPHOR.

WITH SEVERAL ADDITIONAL FORMULAS FOR UNCTUOUS, NON-GREASY PREPARATIONS FOR CHAPPED HANDS AND LIPS.

BY M. I. WILBERT,
Apothecary at the German Hospital, Philadelphia.

Claudius Galenus, who was born in Pergamum, Mysia, about the year 130, and whose name, even to-day, is the recognized synonym for medicinal preparations, is said to have been the first to recommend a mixture of grease and water as a cooling and soothing application to the inflamed or irritated skin.

The widely used and variously constituted cold creams of the drug shops, as well as the more uniform, though frequently less elegant, unguentum aqua rosæ of the pharmacopœias, are at best but modifications of the original mixture of grease and water recommended by Galen more than 1,700 years ago.

From the point of view of the consumer, the present-day successors of the ceratum galeni, unguentum leniens or unguentum refrigerans of the early apothecaries are still far from being perfect toilet preparations. The most elegant preparation of cold cream, while it may be a neutral, bland and cooling ointment, is at best greasy, and on this account, if no other, is frequently objectionable as an application for chapped hands particularly.

The discovery of glycerin, in the early decades of the nineteenth century, added a new, and in many respects a most desirable, cura-

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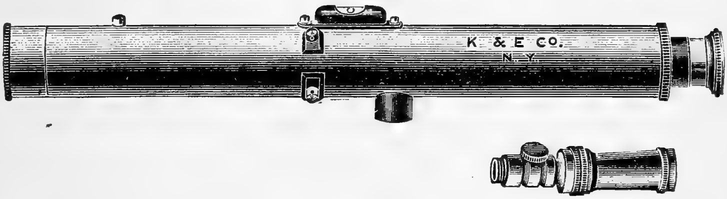

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tive agent for external application. But even glycerin is not a specific, and with many individuals is more irritating than soothing, particularly when undiluted.

To obviate the greasy nature of the one or the irritating, even caustic, action of the other, innumerable suggestions and recipes have been published from time to time. Among the more practicable of these suggestions we may mention the reduction of the relative amount of the grease or oil in the case of cold cream, and the addition of non-objectionable diluents to the glycerin. As an example of a dilute mixture of an oil with water, the following saponaceous mixture, provisionally called "camphor snow," may be tried:

Agar-agar	3	grammes
Water	150	"
Stearic acid	15	"
Sodium carbonate	10	"
Oil of theobroma	15	"
Water	100	"
Alcohol	10	"
Camphor	5	"

The necessary apparatus consists of a so-called farina boiler, or a suitable water-bath, and an egg-beater. The process of mixing is simple, though the following directions may appear to be somewhat complicated.

Dissolve the agar-agar in 150 c.c. of water and strain. To 100 c.c. of water in a farina boiler, or any suitable dish on a water-bath, add the stearic acid and the sodium carbonate; after the carbon dioxide has been driven off, add the oil of theobroma and the solution of agar-agar; mix thoroughly by means of the egg-beater; then remove the container from the water-bath, or source of heat, and continue beating or agitating the mixture until a uniformly smooth lather, measuring about three times the volume of the contained liquids, results.

When nearly cold add the camphor, dissolved in the alcohol. A preparation of this kind can, of course, be varied by the substitution of any desirable perfume or odor for the camphor, or by the substitution of any other desirable fatty oil for the oil of theobroma, or by the substitution of Irish moss or casein for the agar-agar.

Another rather interesting possibility, as a toilet article, is a cream-like emulsion of fatty oil. This, to prevent its being con-

founded with the well-known saponaceous emulsion of oil of turpentine, sometimes called "camphor cream," we will provisionally call "milk of camphor."

It consists essentially of a mixture of a fatty oil, oleic acid and spirit of ammonia with water, and the base is practically the same as petrox, for which a formula was given in this JOURNAL some time ago. (AMERICAN JOURNAL OF PHARMACY, 1901, p. 220.)

A typical formula for a preparation of this kind would be:

Spirit of ammonia	5	grammes
Oleic acid	10	"
Oil of cotton-seed	20	"
Camphor	1	"
Water to make	150	"

To the cotton-seed oil, in a dry bottle or suitable container, add the oleic acid, followed by the spirit of ammonia. In this mixture the camphor is readily dissolved. Now add the water in quantities of from 5 to 10 c.c. at a time, and shake or stir until a uniformly smooth emulsion has been formed. This preparation, like the preceding one, can be varied by using a mineral oil or oil of sweet almonds, or by substituting any more desirable perfume or odor for the camphor.

Among the more desirable preparations of glycerin, a mixture of equal parts of glycerin, rose water and solution of peroxide of hydrogen is probably the most satisfactory. The latter ingredient in this preparation is a particularly useful one, and contributes very materially to its efficiency.

The following may be taken as a type-formula for "glycerin jelly:"

Chondrus	15	grammes
Distilled water to make	420	"
Glycerite of boroglycerin	80	"

Boil the Irish moss on a water-bath with sufficient water to make 420 c.c. of jelly and strain; while still warm add the glycerite of boroglycerin. When nearly cold add any desirable perfume or flavor. Here again the resulting product may be varied by substituting agar-agar, gelatin, tragacanth, starch or quince-seed for the Irish moss; also by replacing the boroglycerin, in whole or in part, by glycerin. The perfume may be varied at will, and may include any one of the thousand and one available odors.

In conclusion, it may be said that preparations that are designed for toilet use may, and properly should, have distinctive characters. They illustrate, much better than the strictly medicinal preparations, the best efforts of the pharmacist for elegance and neatness, and they constitute a legitimate and very valuable opportunity for him to demonstrate his skill and ability.

PROGRESS IN PHARMACY.

A QUARTERLY REVIEW OF SOME OF THE RECENT LITERATURE RELATING TO PHARMACY AND MATERIA MEDICA.

By M. I. Wilbert,
Apothecary at the German Hospital, Philadelphia.

The past year brought us more than the usual number of foreign visitors, who were more or less interested in chemistry, pharmacy and the allied sciences. These visitors were attracted to this country largely by the Louisiana Purchase Exposition, and the accompanying congresses. Many of these visitors, on their return to their native countries, expressed themselves rather freely on the unsatisfactory conditions existing in the present-day practice of pharmacy in America. Ignoring entirely the unfavorable opinions expressed by German writers, we may be permitted to quote from a few of our other foreign visitors, who appear to have been hardly less unfavorably impressed.

A recent number of the *Chemist and Druggist* (London, December 10, 1904, page 948) quotes from an address by Prof. A. V. Pell, before the St. Petersburg Pharmaceutical Society, and says: "Professor Pell described the pharmacies of the United States as occupying an exceedingly low level. They are not pharmacies, but shops dealing in various drinks, such as soda-water, milk, whisky, etc., among which could be found some medicinal substances of an altogether suspicious nature; and the medicines, quite unequal to the pretensions, are sold at fabulous prices, being two or three times as dear as in Russia. The dealers generally have no special knowledge, which the Government on its part does not exact. The American only troubles about business requiring large capital and yielding large profits."

This statement, from the eminent Russian, is possibly too general in its tone to be taken very seriously. The following, taken from a

recent number of the *Pharmaceutical Journal* (December 3, 1904, page 820), is rather more direct and more specific:

Mr. Joseph Colman, a member of the Pharmaceutical Society, says: "The first thing that struck me about American Pharmacy is that, for the most part, if I may use the paradox, it is not pharmacy at all, as Europeans understand the word. In America the drug-store is a place where hats are cleaned, where cigars, and candy, and cutlery, and the inevitable soda fountain, combine to reduce to a minimum the attention bestowed on drugs. There are in New York, Chicago and other large cities a few pharmacies of the English type, but even there the candy and the soda-water are not wanting.

"I think the difference between American and British pharmacy is to be found in this fact: Pharmacy has developed here as an outgrowth from the medical profession—the old apothecaries were both doctors and druggists. But on the other side the history is altogether different. Pharmacy has grown—and, up to now, not grown to any lofty height—out of the general store—out of the grocery, if you like. There is, however, plenty of hope for the future, and that hope lies in the gradual awakening to the truth on which British leaders of pharmacy have always insisted—that in scientific education, if anywhere, lies the foundation for pharmaceutical progress."

A Frenchman, Jules Huret, editor of *Figaro*, Paris, says: "For the European traveling in America nothing is more surprising than the shops of the apothecaries. They call themselves druggists, chemists, pharmaceutical chemists, or, when of German origin, Apotheker. The ordinary apothecary shop is a veritable bazaar. Over the door we may find, in modest letters, the word 'Drugs,' while extending out over the sidewalk is a large sign, with immense letters, announcing 'Ice-Cream Soda,' the favorite beverage of the native American. In addition to this leading article we find the tobacco counter, and, adjoining that, confectionery, paper, brushes, combs, sponges, toilet articles and perfumery. We may also find razors, artists' materials, playing cards, sporting goods and, everywhere, the public telephone at five and ten cents a call. In addition to these commodities we can in many cases secure carriages, express wagons, moving vans, messengers, servants, stamps, and even money orders, by mail or express.

"The American drug store frequently contains a circulating

library, is used as a waiting-room for the street railways and furnishes news, gossip and general information to all that apply. If we observe closely, we will find that, in addition to all of these commodities, there is, in an obscure and out-of-the-way portion of the store, a small section containing the drug department, where prescriptions are said to be compounded." (*Phar. Post,* 1904, page 714.)

We in America are, however, not the only ones that are slightly backward in our scientific development. This is evidenced by a recent article on "Retrospect and Prospect of Pharmacy," by Mr. David Murray (*Phar. Jour.*, 1904, page 864), who says: "If pharmacy is yet to be recognized as an organized profession, or if pharmacists are to revive the respect due to their rights, it will only be acceded to when pharmacists, individually and collectively, have proved by education and organization that they merit such attention."

Another writer in the same journal (*Phar. Jour.*, 1904, page 848) says: "After everything that could be done to protect trade interests during recent years has been done, pharmacists are still faced with the difficulty of convincing the legislature and the public that they have a just claim to be regarded as a distinct professional class."

No doubt the reasons for this comparatively unsatisfactory condition of pharmacy in Great Britain, as well as in America, is to be found in the low standards of pharmaceutical education.

A synopsis of the pharmaceutical education required by the several European governments, which was republished in a recent number of the *Pharmaceutical Journal* (December 3, 1904), is particularly interesting in this connection. From this synopsis it appears that, with the single exception of England, the large Continental countries require from five to ten years of special study for the prospective pharmacist. All of the Continental countries, in addition, require the equivalent to matriculating at the universities as a preliminary requirement.

The Metric System of Weights and Measures in Great Britain.—The secretary of the "Decimal Association," in a communication to the *Pharmaceutical Journal* (December 24, 1904, page 951), asserts that prospects are very favorable that the metric weights and measures bill will be acted on favorably by the House of Commons at an early date.

Over 330 votes of members of Parliament have been promised in support of the bill in the lower house. The secretary also recounts a list of representative bodies who have petitioned Parliament in favor of the reform.

The Metric System in Medicine.—The impending introduction of the metric system of weights and measures into Great Britain has been the direct cause o considerable discussion on the supposed shortcomings of that system from a practical point of view.

While many of the points are, perhaps, not very well taken, and while many of the suggestions that have been made are quite impracticable, there is one, a practical name for the quantity of a fluid contained in a cubic centimeter, that has made its appearance in a recent number of the *Pharmaceutical Journal,* and is well worth repeating. This quantity, frequently referred to as c.c., it is proposed to call a mil, from milli liter, the thousandth part of a liter. If this name were generally adopted we could have deci-mil, centi-mil and milli-mil, for the tenth, hundredth and thousandth part of a c.c.

Proprietary Medicines in New Zealand.—According to a recently published regulation the government of New Zealand will require that after June 30, 1905, "All patent medicines imported or sold in the colony must have the contents, with their exact proportions, legibly printed on the bottle, box or container, and if any poison is contained in the medicine, the words 'This contains poison' must be added. (*Phar. Jour.*, 1905, p. 94.)

The History of Pharmacy has attracted more than usual attention during the past three months. In Germany a most comprehensive History of Pharmacy, by Hermann Schelenz, has but recently been published by Julius Springer, Berlin. This book contains upwards of 900 pages and includes a history of pharmacy and the allied sciences from the earliest times to the present.

The History of the Paris School of Pharmacy, which has been in press for nearly a year, is said to be ready for distribution in the near future. A copy of this book, which, as will be remembered, is being published as a memorial of the centenary of the Superior School of Pharmacy was shown at a recent meeting of the Society of Pharmacy of Paris, where it elicited favorable comment.

The Pharmacopœia as a Reflection of Contemporary Development is the title of a series of articles contributed by Prof. A. Tschirch (*Schweiz. Woch. Schr. f. Chem. u. Pharm.*, 1904, p. 602, et seq.) on

the origin and development of the several pharmacopœias published in Europe. From these articles it would appear that the first official pharmacopœia was published in Nürnberg, Germany, in 1546.

An interesting *sketch* of the origin and continuance of the *Pharmaceutical Journal*, by the veteran writer, Mr. Joseph Ince, has recently appeared in the pages of that journal. (*Phar. Jour.*, 1904, p. 804.) From this sketch it would appear that the *Journal* began in 1841 as a private enterprise, being owned and controlled by Mr. Jacob Bell. It was the first journal of its kind to be published in Great Britain, and is to-day the second oldest pharmaceutical journal published in the English language.

Among the early contributors are enumerated such representative British pharmacists and scientists as Dr. Andrew Ure, Professor Redwood, Prof. George Fownes, Prof. Jonathan Pareira, Thomas Morson, Dr. W. F. Daniell, J. B. Groves, who were in turn followed by such men as Daniel Hanbury, John Barnard, Robert Bentley and the still surviving Joseph Ince.

From 1841 to 1870 the *Journal* was published as a monthly; since 1870 it has been published in its present form as a weekly.

The Year Book of Pharmacy, containing a complete account of the meeting of the British Pharmaceutical Conference at Sheffield, England, has been distributed to the members. In addition to the papers read at the Sheffield meeting, this book also contains a well arranged and quite exhaustive review of the current literature relating to pharmacy.

In this connection it is also announced that a general index covering the volumes from 1886 to 1903 will be ready soon and that the price for this index has been fixed at the moderate sum of 3s. 6d., post free. For those who desire a copy of the previous index, 1864 to 1885, the two volumes will be supplied at 5s. 6d., post free.

The first number of the *Journal de Pharmacie et de Chemie* for 1905—the ninety-sixth year of its publication—appears with the name of M. Bourquelot as the principal editor. M. Emile Bourquelot, it will be remembered, is the head pharmacist at the Laennec Hospital, Permanent General Secretary of the Society of Pharmacy of Paris, Professor of Galenical Pharmacy at the Superior School of Pharmacy, Paris, and has but recently been appointed a Chevalier of the Legion of Honor. M. Bourquelot comes to his new position well prepared. He has been a frequent contributor to phar-

maceutical literature, and has been on the editorial committee of the *Journal de Pharmacie* for a number of years.

Adulterated Digitalis.—An examination of the powdered digitalis leaves in a number of Austrian pharmacies has disclosed the fact that some of the supposed digitalis consisted of powdered verbascum leaves. (J. Moeller, *Phar. Post*, 1904, page 677.)

Dr. Wilhelm Mitlacher, in a more recent number of the same journal (*Phar. Post*, 1905, page 41), reports finding two samples of supposed digitalis leaves that consisted entirely of a mixture of Verbascum and *Inula Conyza* D. C. (*Conyza Squarrosa* L.)

Adulteration of Oil of Eucalyptus with Castor Oil was recently reported by C. J. Bennett (*Chem. and Drug.*, 1905, page 34). From the reported characteristics of this particular mixture, it would appear to be one that is not readily detected in the ordinary way.

A ready method to distinguish pure sulphate of quinine from the commercial article. If 0·2 gramme of the quinine salt be dissolved in 5 c.c. of a mixture of 30 volumes of petroleum ether (spec. grav., 0·68) and 70 volumes of chloroform, the filtrate when diluted with three times its volume of petroleum ether, will remain perfectly clear if pure quinine sulphate has been used. Other cinchona alkaloids, when present, will give a distinct precipitate. By this method, it is asserted, an admixture of 0·1 per cent. of foreign alkaloids to quinine may be detected (*Zeitschr. f. Anal. Chem.* through *Zeit. d. Allgemein. Oest. Apothek. Ver.*, 1904, 1370.)

Antichoren.—This is said to be a mercuric iodochloride. It occurs as a dark-brown amorphous substance that is soluble in water in all proportions. When given internally it is readily absorbed, and may be advantageously substituted for the usual mercurials in syphilis. It is given in doses of 0·01 three or four times a day. (*Suddeut. Apoth. Zeit.*, 1904, page 889.)

Castor Oil in powder form.—A recent German patent provides for the mixing of an emulsion of castor oil with an equal weight of calcined magnesia, the added water is subsequently evaporated and the resulting mass powdered. (*Suddeut. Apoth. Zeit.*, 1905, page 36.)

Formane, a combination of formaldehyde and menthol as an inhalation, is said to be a useful remedy for cold in the head. The following is a typical formula :

Menthol, 10.; formaldehyde, 5·; oil of geranium, 0·5; mix and use in a smelling bottle. (*Phar. Jour.*, 1904, page 967.)

Jaborandi Leaves of Commerce.—E. M. Holmes (*Phar. Jour.*, 1904, page 891) says that for some years there has been great difficulty in obtaining the jaborandi leaves official in the British Pharmacopœia.

During this period a considerable quantity of the Rio and Maranham jaborandis have been on the market. The latter, *P. microphyllus*, usually comes into the market in good condition, and yields, according to Paul and Cownley, as much as 0·84 per cent. of a crystalline nitrate of pilocarpine that, like the alkaloid obtained from *P. jaborandi*, appears to be a mixture of two nitrates—one, isopilocarpine, having a melting point of 159°, and the other, pilocarpine, melting at 146°.

Rio jaborandi (*P. pennatifolius*) varies much in appearance, and does not yield more than half the amount of crystalline alkaloid usually obtained from the Pernambuco or Maranham varieties.

Kryptol.—This is a grayish-black, granular substance, having considerable electrical resistance. It is composed of clay, carborundum and graphite, and is said to have a melting point that is upwards of 3,000° C. It is being used to economically convert electrical energy into heat. (*Suddeut. Apoth. Zeit.*, 1904, p. 790.)

Menthyl Camphorate.—The camphoric acid ester of menthol; this is a white substance, insoluble in water or chloroform, but soluble in alcohol, ether and the fatty oils. It melts at 86° C., and is decomposed by boiling water. (*Zeitschr. d. Oest. Apoth. Ver.*, 1904, p. 1518.)

Salibromin.—This has been recommended as an antiseptic remedy for rheumatism and as a febrifuge. It is insoluble in water and in acids. Given in doses of 0·50 and as much as 5·00 in twenty-four hours. (*Phar. Jour.*, 1904, p. 852.)

Trigemin, a mixture of butyl chloral and pyramidon, occurs in long acicular crystals, melting at 85° C., and freely soluble in water. Used as an analgesic. (*Zeitschr. d. Allgemein. Oest. Apoth. Ver.*, 1904, p. 1518.)

Zinc Borate, or Oxyborate.—This is a powder combining the antiseptic properties of boric acid with the drying and absorbent properties of oxide of zinc, and may be made by the following formula:

Dissolve 500 grammes of zinc sulphate in from 5 to 10 liters of

water, and add to this solution 443·6 grammes of borax mixed with 309 grammes of a 15 per cent. solution of caustic soda, collect the precipitate, wash until free from sulphates and dry. (*Phar. Jour.*, 1905, p. 75, from *Arch. d. Phar.*)

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Traite Elementaire de Physico-Chimie, ou lois générales et théories nouvelles des actions chimiques. Par M. Emm. Pozzi-Escot. Paris: Librairie Polytechnique. Ch. Béranger, Editeur. 1905. Pp. 627.

This is a text-book of general chemistry as interpreted by the modern physical chemists and is a very complete and satisfactory presentation of the views held to-day on this subject. It is, moreover, a presentation of these views in which mathematics is avoided as far as possible, so as to make it understood by the average chemist who does not wish to undertake the study of certain parts of mathematical physics, such as thermo-dynamics, as a preface to physical chemistry.

The well-known fundamental laws of chemistry, such as those of gaseous combination, the atomic theory and the meaning of valence and its applications in the establishing of chemical equations, are first reviewed; the properties and general laws of the gaseous state are then discussed, followed by an account of specific heats of the elements and a classification of the elements. In the latter, the periodic system of Mendelieff is fully explained and deductions from the same noted. At the end of this chapter mention is made of the discovery of the five rare inert atmospheric gases by Ramsay, and that their discoverer had fitted them into the periodic system constituting a group for themselves, but the author does not incorporate them in his table of elements as is now generally done.

The next chapter, dealing with the properties of liquids, describes the phenomena of molecular diffusion of liquids and from that goes on to speak of osmotic pressure, which is well explained with the aid of several simple illustrations which help one in the understanding of this important phenomenon and its meaning. This leads to the statement of the modern theory of solutions as first proposed by Arrhenius.

Thermo-chemical changes are discussed in a separate chapter and endothermic and exothermic reactions illustrated, the methods of calorimetric measurement of chemical changes being also described. An account of luminous radiations includes the subjects of photometry and spectroscopy, as well as a description of the newer forms of radiation, such as the Roentgen rays, the N rays and the phenomena of radio-active matter, in connection with which Crookes' interesting speculations on the changeable nature of matter are noted. The newest results of Ramsay and Rutherford are not mentioned, however.

No book on modern physical chemistry would be complete without an account of Gibbs' famous phase rule and the various systems of equilibrium in chemical reaction, and this we find well explained in Chapter XV. A discussion on electrolytic phenomena which develops the idea of the ion, and a final chapter on the application of the theory of the ions and the scientific principles underlying analytical chemistry, complete the book.

No one wishing to master the principles of chemistry and its wide-reaching possibilities can any longer ignore the great development of physical chemistry which has taken place in the last decade or two, and for one able to follow in the French language the book seems to furnish an excellent and not too mathematical survey of the field.

S. P. Sadtler.

In Memoriam Charles Rice. Printed for private circulation by J. B. Lippincott Co., Philadelphia, 1904.

This is a neat octavo volume of sixty pages, with seven inserts containing appropriate and well executed illustrations. Bound in full black leather, with gold lettering, this little volume represents probably the acme of the printer's and bookbinder's art. In style and appearance it is thoroughly in harmony with the man whose name it is designed to perpetuate and to honor.

The first nineteen pages are devoted to a general outline sketch of the life of Charles Rice, while the remaining pages contain a list of the "Degrees, Titles and Memberships of Dr. Charles Rice;" "A Bibliography of the writings of Dr. Charles Rice;" "Personal impressions and recollections of Dr. Charles Rice;" "Resolutions of the Board of Trustees of the United States Pharmacopœial Convention;" "Resolutions of the College of Pharmacy of the City of

New York;" "Resolutions of the National College of Pharmacy;" "Dedication of the Monument to Charles Rice, Ph.D.," and "The Rice Memorial Committee."

In the biographical sketch, unfortunately, there is a most lamentable absence of detailed information, in connection with the numerous subjects enumerated. For this general lack of detail there can be but two reasonable reasons—dearth of material, or lack of funds. The former of these can hardly be accepted as valid, while the latter would constitute a lasting disgrace to the profession of medicine as well as to that of pharmacy, as the standing of both of these professions has been manifestly advanced by the disinterested efforts of this lone, and in many respects lonely, man.

It would, for instance, be interesting to know how Charles Rice, who, as one writer in this memoir suggests, was but an insignificant part of a great political machine, contrived, "despite the vicissitudes of political fortune," to conduct his own individual department on such a high ethical plane that even the leaders of that political machine did not essay to dictate, or even to suggest to him what his policy should be or how he should conduct his department. Recognizing the difficulties under which he labored, it would be interesting indeed to know how Charles Rice, for thirty-five years, was able to personally conduct and direct the work done in the largest general drug bureau in this country, to the complete satisfaction of the numerous interests involved and with credit to himself and his assistants.

It would also be interesting to know how, through all this period of time, while engaged in work so foreign to research and study, he was able to preserve his interest in all that pertained to Oriental literature and languages.

Last, but by no means least, it would be interesting to know how, in addition to all this, Charles Rice was able to take such an active, or, as is generally admitted, the leading part in producing the two works that will ever be recognized as being pre-eminently the leading features of the American pharmacy of the latter decades of the nineteenth century; the sixth decennial revision of the United States Pharmacopœia and the National Formulary. As Chairman of the Committee of Revision of the United States Pharmacopœia and as Chairman of the Committee on National Formulary of the American Pharmaceutical Association, Charles Rice essayed to do, and did

do, work that will be recognized as a credit to pharmacy in time still to come.

A more detailed account of the work done in connection with these two works alone would prove interesting and would be of inestimable value as an incentive for better work on the part of future pharmacists. Information relating to this particular feature of his work must be still available. It can hardly be supposed that of the thousands of circular letters, written and prepared by him himself, none have been preserved. But, even if this were true, we still have the voluminous report of the Committee of the American Pharmaceutical Association on the Revision of the United States Pharmacapœia, published in 1880; the files of the proceedings of the American Pharmaceutical Association; the National Formulary; the Pharmacopœia of the United States; the Digest of Criticisms, and last but not least, the personal recollections of a number of his co-workers and contemporaries who should, and no doubt would, furnish the information necessary for a more extended sketch of this eminent pharmacist. It is sincerely to be hoped, therefore, that this little volume is but a forerunner of something still more elaborate in the future, and that the present, or at least the succeeding Pharmacopœial Revision Committee may see its way clear to collect and record much that will be of interest in connection with a study of the life work, times and surroundings of this truly noble, original and unselfish worker in the field of pharmacy.

M. I. W.

THE URINE, THE GASTRIC CONTENTS, THE COMMON POISONS AND THE MILK. By J. W. Holland, M.D., Professor of Medical Chemistry and Toxicology, Jefferson Medical College of Philadelphia. Seventh edition, revised and enlarged. P. Blakiston's Son & Co. 1904.

This handy laboratory manual, embracing as it does the clinical microscopy and chemistry of the urine, as well as the clinical chemistry of the gastric contents, the common poisons, including alkaloids and the milk, is a most compact, as well as trustworthy, laboratory guide for the practical clinician or the up-to-date pharmacist.

It is a substantially bound working guide, with every other page blank, for the addition of certain data which the practical man should have in close proximity to the original considerations.

One valuable feature of this volume is that it not only describes instruments that are upon the market for performing the special

tests and methods of applying the same, but frequently gives a method whereby a few pieces of glass tubing or a common test tube will practically accomplish the same results with much less expenditure. It might also be noted that methods for the centrifugal estimation of the mineral sulphates, phosphates and albumin prove a valuable addition, as well as the latest tests for the presence of sugar in the urine ; formaldehyde in milk, and Ewald's test for the condition of the stomach. In connection with some of the tests for abnormal constituents of the urine, the following subdivisions are noted, which in themselves should commend it to a careful worker, namely, principal reagents, methods of applying, test precautions to be observed, fallacies and delicacy of tests, volumetric, gravimetric or centrifugal estimations, objections to and advantages of these methods. It might also be noted that the preparation of artificial morbid urines for practicing the various tests, Freund's method for the determination of acidity, preliminary standardization, and Toepfer's method for estimating free and loosely combined acids, are among the latest additions to this publication.

W. S. WEAKLEY.

EDITORIAL.

PROPOSED AMENDMENT TO THE PHARMACY ACT IN PENNSYLVANIA.

The requirement of graduation from a college of pharmacy prior to examination by a board of pharmacy has been unanimously indorsed by the American Pharmaceutical Association, the various State pharmaceutical associations, and the International Pharmaceutical Congress, which met in Chicago at the time of the Columbian Exposition, as well as by other organizations interested in pharmaceutical progress. (See AMERICAN JOURNAL OF PHARMACY, August and September, 1904.)

While the proposition favoring the enactment of a law requiring every applicant for a proprietor's or manager's certificate to be a graduate of a reputable college of pharmacy, probably originated in Pennsylvania, it has remained for New York State to first pass a law of this kind.

A bill of this kind is again before the Pennsylvania Legislature, and the only changes proposed in the present Pharmacy Act are the following:

(1) A candidate for a proprietor's or manager's certificate must produce satisfactory evidence that he is a graduate of some reputable and chartered college of pharmacy.

(2) The amendment does not become operative until January 1, 1906, and it *only applies* to those going into business after that time; it does not affect druggists *already in business* or *clerks* applying for qualified assistants' certificate before the Board.

This subject has been so frequently discussed that it seems hardly necessary to present any further arguments in support of legislation of this kind, but in order that the pharmacists of this State may realize the necessity for writing to their respective senators and representatives, so that they may be assured that there is a real need for the enactment of the proposed amendment, we here present some of the more specific reasons for its enactment, as set forth by Prof. Joseph P. Remington.

(1) The amendment is needed to elevate pharmacy to the standard which the retail pharmacist of the State is entitled to, because his position is most responsible before the community, and the greater attainments of the pharmacist of to-day warrant the same recognition at the hands of the public as that accorded to physicians and dentists of this State, who have the same provision in their medical and dental laws.

(2) The passage of such an amendment does not work hardship upon any druggist doing business in the State to-day, and on account of the prerequisite law now operative in the State of New York, the passage of this amendment will prevent a flood of druggists who are not graduates from coming into this State and going into business here, because they are unable or unwilling to qualify themselves so as to comply with the law in the State of New York. As a protective measure it especially commends itself at this time.

(3) A profession, trade or occupation which is united in the work of excluding uneducated and incompetent men from lowering the standard of the whole must commend itself to your judgment.

(4) The American Pharmaceutical Association, the Pennsylvania Pharmaceutical Association, the Philadelphia Retail Druggists' Association, the colleges of pharmacy and the State Board of Pharmacy have passed resolutions or have signified their approval of this amendment.

(5) The medical profession, as a body, throughout the State

favor it because any measure which improves the practice of pharmacy by demanding higher educational requirements from the manager or proprietor of a pharmacy, increases the value of the physician to the public, because if the doctor's prescriptions have not been intelligently and safely compounded, his efforts to save the patient's life are null and void.

When we consider the benefits that have accrued to the medical and dental professions in the State of Pennsylvania since the enactment of the laws requiring that only those who can practise these professions in this State shall be graduates of reputable medical and dental schools or colleges, it is but fair to ask that the pharmaceutical profession receive equal consideration at the hands of our legislature. The advances in one of these professions should be followed by similar advances in the others, as they are more or less allied in their aims, and are all more or less intimately concerned with the public health.

DR. FRIEDRICH HOFFMANN.

The news of the death of Dr. Friedrich Hoffmann, at his home in Berlin, on November 30th, was more or less anticipated, for it was known to his friends that his health had been in a precarious condition for some years past. Dr. Hoffmann spent the best years of his life in this country, and to him American pharmacy is much indebted for the progress made during that time. Dr. Hoffmann was elected an honorary member of the Philadelphia College of Pharmacy December 30, 1895, and we feel that we cannot do better than to give the sketch of his life prepared by his friend and co-laborer, Dr. Frederick B. Power, which appeared in the *Chemist and Druggist* (London), December 10, 1904:

"It is a sad duty for the writer of these lines to record the death of one of the veterans of scientific pharmacy, Dr. Friedrich Hoffmann, which occurred at his home in Charlottenburg on November 30th. The realization of the loss which has thus been sustained, and which will be deeply felt by a large circle of professional associates, becomes accentuated to one who for thirty years had known him in the more intimate relations of a true and kind friend.

"Friedrich Hoffmann was born in Wriezen-on-the-Oder on June 20, 1832. His early instruction was received from his father, who was distinguished both as a theologian and philologist, and was at one time a councilor of the Consistory at Stettin. He then attended

the Joachimsthal Gymnasium in Berlin, and in 1847 began his apprenticeship in pharmacy. From 1854 to 1856 he studied at the University of Berlin, where it was his privilege to receive instruction from such eminent teachers as Mitscherlich and Heinrich Rose, in chemistry; Otto Berg and Alexander Braun, in botany and pharmacognosy; Ehrenberg, in microscopy; Dove and Magnus, in physics; Johannes Müller, in physiology; and Carl Ritter, in comparative geography. But a little more than a year has passed since the writer had the opportunity of walking with Dr. Hoffmann through the grounds surrounding the old University buildings in Berlin, and many interesting and touching reminiscences were then recounted of the time, nearly half a century ago, when, as a young and enthusiastic student, Hoffmann spent there many happy days. Not less interesting were his elaborated notes on the lectures and laboratory-work of that period, in many cases illustrated with handsome pen-sketches, which had been carefully preserved through all the wanderings of the intervening years, and in which he evinced a justifiable pride. It was evident that even at that early age the young apothecary had shown exceptional talent, and that he had pursued his studies with something more than ordinary zeal and diligence.

Having passed his State examination in pharmacy with the highest honors, and with a special inclination towards the sciences of botany and forestry, Hoffmann applied himself for a time to these studies, but, after having taken his degree at the University of Jena, in 1859, circumstances rendered it necessary for him to change his plans and return to pharmacy. Thus, after some years devoted to this pursuit in his native country, he left Germany in 1862, and established himself in the city of New York. In the metropolis of the New World, which was destined to be his home for a period of thirty-four years, Dr. Hoffmann's sound scientific training and literary abilities soon found recognition and appreciation. During the first four years of his residence in the United States he was engaged in teaching, and as an expert or adviser in connection with various chemical industries. For the next sixteen years he was engaged in the practice of pharmacy, although still finding time for a large amount of literary work. This found expression in several papers on the subjects of pharmaceutical education and legislation, and in a number of interesting biographical sketches, including those of some of his earlier teachers at the University of Berlin,

which were published chiefly in the *Popular Science Monthly*. He also issued, in 1872, a work entitled "A Manual of Chemical Analysis as Applied to the Examination of Medicinal Chemicals"; of this a third edition, in which the present writer collaborated, appeared in 1882. For two years, 1881–83, Hoffmann served as a chemical expert on the New York State Board of Health.

To the changes which time had effected in the practice of pharmacy, involving a departure from the conservative and strictly professional methods of the school in which he had been trained, Dr. Hoffmann could never become completely reconciled, and many of the duties which this pursuit entailed became to one of his temperament and culture increasingly onerous and uncongenial. For this reason he was induced in 1882 to dispose of his business and establish a new pharmaceutical periodical, which, under the title of the *Pharmaceutische Rundschau*, he conducted with marked ability and success for a period of thirteen years, and, in a somewhat altered form, it still continues to be issued as the *Pharmaceutical Review*. As the writer has stated on a previous occasion, when reviewing Dr. Hoffmann's service to pharmacy:

> In the field of journalism he not only found a congenial occupation, but the resources of his mature and cultured mind, his broad scientific training, and his extended knowledge of practical affairs, together with his ability to form and express correct opinions regarding current problems and events, all served to impart to his writings a distinctive character and a literary value which will be appreciated and admired by all reflective students who peruse them for generations yet to come.

At the close of 1895 Dr. Hoffmann decided to discontinue his journalistic labors and seek rest and retirement in his native land; but it was contrary to his nature, and incompatible with a life of such intense activity, to remain for any length of time without some form of occupation. With the opportunities afforded him by the large libraries of the Continent he soon became engaged in historical researches, and, in collaboration with Dr. Gildemeister, of Leipzig, he produced the very comprehensive work on the essential oils, entitled "Die ætherischen Oele." This was issued in 1899, and may be regarded as a most worthy and crowning effort of his literary career.

On the occasion of the Jubilee of the American Pharmaceutical Association, which was celebrated at Philadelphia in the summer of 1902, Dr. Hoffmann was invited to deliver an address, and in re-

sponse to this request, he crossed the Atlantic, in order that he might once again meet the many friends who had conferred upon him this honor. Unfortunately, however, he was even then in such a feeble state of health as to render necessary his almost immediate return, thus compelling him to forego the long-anticipated pleasure of delivering his address in person, which was naturally a grievous disappointment, both to himself and to his friends. The subject he had selected for his discourse was "A Retrospect of the Development of American Pharmacy and the American Pharmaceutical Association," which was published in the "Proceedings" of the Association for 1902, and occupies forty-five closely printed pages. It would be needless here to refer to the thoroughness of its exposition and the charm of its diction.

The varied and exceptional attainments of Dr. Hoffmann and the service rendered by him in pursuit of the higher aims and ideals of pharmacy have been widely recognized, and he was the recipient of many distinctions, both in America and on the continent of Europe. Although in his sterner moods, and by his strong dislike of the superficial, as also by his determined and uncompromising views on many subjects, he was sometimes misunderstood or even harshly judged, yet those who were privileged to know him most intimately could not fail to have been impressed by his many noble qualities, by his generous nature, his kindness of heart, and by the encouragement and inspiration which he afforded those of younger years, to whom by his sympathies he was attracted.

In the attempt which has been made to delineate some of the more prominent features of a life so eventful as that which has now closed, the writer is fully conscious of the fact that the representation he has given is a very inadequate one; but the work and influence of the man will endure, however ephemeral and incomplete may be the tribute which friendship is permitted to bestow.

> And such is human life; so gliding on;
> It glimmers like a meteor, and is gone.

PHARMACEUTICAL MEETINGS.

JANUARY AND FEBRUARY.

The regular pharmaceutical meeting of the Philadelphia College of Pharmacy was held in the museum of the college on Tuesday

evening, January 10th, with W. L. Cliffe, member of the Pennsylvania Pharmaceutical Examining Board, in the chair. The meeting was a notable one in several particulars and will probably go down in history as one of the most important meetings of its kind ever held at the college, certainly in recent years.

The main topic chosen for consideration was that of the ethical relation of pharmacists and physicians, there being three addresses along this line.

Dr. Henry Beates, Jr., President of the State Board of Medical Examiners, was the first speaker and read a paper on "A Brief Consideration of a Few Facts Determining the Relationship between the Science and Art of Pharmacy and the Science and Art of Medicine." (See February number, page 51.)

Prof. John H. Musser, President of the American Medical Association, took for his theme the following: "A Tendency in Medicine and its Influence on Pharmacy." (See February issue, page 58.)

M. I. Wilbert, Ph.M., followed with a paper "On the Evident Need of a Profession of Pharmacy." (See February number, page 64.)

A number of physicians and pharmacists, both in Philadelphia and elsewhere, had been invited to take part in the discussion, and Prof. Henry Kraemer, Secretary of the Committee on Pharmaceutical Meetings, read letters from the following, regretting their inability either to be present or to send a communication: Dr. William Osler, Dr. J. C. Wilson, Dr. H. C. Wood, Dr. Oliver T. Osborne, Dr. H. A. Hare, Dr. James Tyson and Walter A. Rumsey.

The general discussion was participated in by the following: Dr. Beates, Warren H. Poley, Prof. Joseph P. Remington, Dr. Clayton M. Thrush, M. I. Wilbert and George M. Beringer. (See February number, page 70.)

Dr. Thrush said that he had had eight years experience as a pharmacist, and that he believed the prerequisite law for pharmacists should be enacted. Then referring to the shortcomings of physicians and pharmacists, he said that some pharmacists will substitute and that some physicians will order all of the new remedies that come out; sometimes they order only one prescription and the rest of the preparation is dead stock. He said that he had recently examined 1,000 prescriptions from leading stores of this city, and that only two of them were in the metric system, notwithstanding the fact that this system is taught both in schools of medicine

and schools of pharmacy. Another feature of these prescriptions was the frequent ordering of proprietary remedies.

Professor Remington spoke of the pre-requisite law now being considered by the Pennsylvania State Legislature and asked Dr. Beates to aid in securing its adoption. Dr. Thrush added that he believed that the pre-requisite law for pharmacists should be enacted and should receive the support of pharmacists and physicians.

Dr. P. N. K. Schwenk, an attending surgeon to Wills Eye Hospital, was the last speaker on the programme and read a paper on "The Size of the Dropper as Applied to Eye Drops Containing Alkaloids." (See page 123.)

Professor Remington said, in discussing this subject, that droppers are frequently used for other purposes than as eye-droppers. He said there was much difference in the size of drops, depending upon the kind of liquid used. He then referred to the dropper which also serves as a stopper and said that an attempt had been made to make this accurate. (See also page 125.)

Dr. Schwenk said that he favored sterilization, and that in preparing for operations on the eye he had his instruments sterilized each time. In preparing eye-drops he said it was his custom to boil the water and then add the alkaloid to the cooled liquid.

Mr. Poley spoke of a case of poisoning resulting from the use of a dropper that had been previously used.

On motion of Thomas H. Potts a unanimous vote of thanks was tendered the speakers of the evening.

The fifth of the present series of pharmaceutical meetings of the Philadelphia College of Pharmacy was held on Tuesday afternoon, February 14th, with Prof. Joseph P. Remington in the chair. The meeting was well attended, and partook of the nature of a symposium, the alcohol question being considered from various points of view.

Dr. H. W. Wiley, Chief of the Bureau of Chemistry, United States Department of Agriculture, gave an address on "Methyl Alcohol—what is it and what is it good for?" (See page 101.)

Prof. Samuel P. Sadtler read a paper in which he discussed "Methods for the Detection of Methyl Alcohol in Ethyl Alcohol." (See page 106.)

A paper by Mahlon N. Kline, Chairman of the Committee on

Legislation of the National Wholesale Druggists' Association, on "Some Reasons Why the Internal Revenue Tax on Alcohol Should be Reduced, and Why Our Government Should Provide Free Denaturized Alcohol for Use in the Arts," was read by Prof. Charles F. Parsons. (See page 111.)

Dr. A. R. L. Dohme, of Baltimore, sent a communication condemning the use of methyl alcohol for pharmaceutical purposes. He expressed the hope that Congress would grant the reduction in the tax on ethyl alcohol, and thus largely eliminate this excuse for the use of wood alcohol for any purpose connected in any way with medicine or pharmacy. (See page 119.)

The subject was further discussed by Dr. Henry W. Cattell (see page 121), Professor Sadtler, Dr. C. B. Lowe, Warren H. Poley and Dr. Wiley.

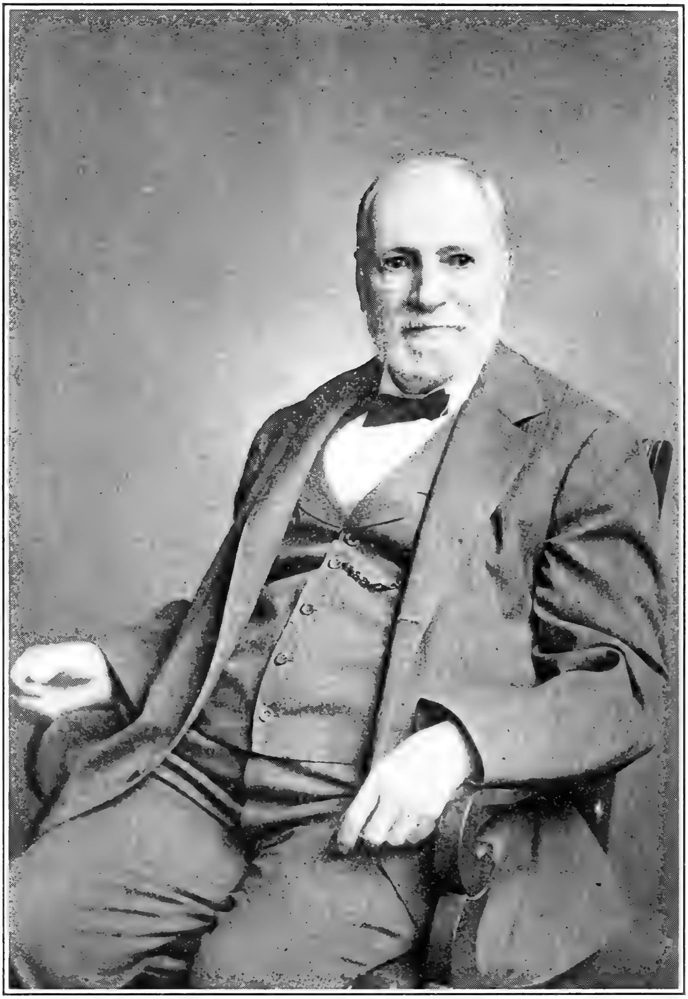
Mr. Poley said that milk which contained either formaldehyde or sodium borate or boric acid would not coagulate properly upon the addition of rennet, and he desired to know if this could be considered in the nature of a test for these substances. Dr. Wiley said that his experiments had not covered this point, but that he thought that any substance which prevented the action of ferments would interfere with the action of rennet, it being in the nature of a ferment.

M. I. Wilbert read a paper on "Camphor Snow and Milk of Camphor," and exhibited samples of these preparations. (See page 128.)

Prof. C. Lewis Diehl, Louisville, Ky., was present, and was called upon for some remarks by the chairman. Mr. Boring said that the older members classed Professor Diehl with such men as Procter, Parrish and Maisch, and that he was a veteran of the civil war, and had been left on the battlefield at Stone River for dead, but that his life had been spared to assist in the development of American pharmacy.

The next meeting will be held on Tuesday evening, March 21st, when the subject of professional or scientific pharmacy will be considered. Papers will be read by Prof. Henry P. Hynson, of the University of Maryland; Dr. Wm. C. Alpers, New York City. George M. Beringer, Ph.M., will read a paper on "The Evolution of Nostrum Vending and its Relation to the Practice of Medicine and Pharmacy."

HENRY KRAEMER,
Secretary.



WILLIAM WEIGHTMAN,
1813–1904.

THE AMERICAN
JOURNAL OF PHARMACY

APRIL, 1905.

WILLIAM WEIGHTMAN.

By Howard B. French.

By the death of William Weightman, head of the chemical manufacturing firm of Powers & Weightman, in August last, America lost one of her most prominent industrial chemists.

Mr. Weightman was elected a member of the Philadelphia College of Pharmacy in 1856, and maintained an interest in the work of the institution until the time of his death. The last time he visited the College he spent more than an hour going over the buildings with the writer, offering practical suggestions as to anticipated changes, and manifesting the deepest interest in the most minute details of construction, arrangements and appliances. Through his co-operation the present College House, with accommodations for sixty students, was secured a short time before his death.

William Weightman was born on September 20, 1813, in Waltham, Lincolnshire, England. At the solicitation of his uncle, John Farr, he came to this country in 1829, and obtained employment with the firm of Farr & Kunzi, manufacturing chemists.

John Farr came to Philadelphia in the early part of the last century and was the first to manufacture sulphate of quinine in the United States, and it is interesting to note that he was devoting his attention to an investigation of the cinchona alkaloids about the time that Pelletier and Caventou announced the discovery of quinine. This was in 1820, and two years previously Mr. Farr had formed a partnership with B. Kunzi, which partnership continued until 1836, when Mr. Kunzi retired. Mr. Farr then associated with himself Thomas H. Powers and his nephew, William Weightman, under the firm name of Farr, Powers & Weightman. After the decease of

Mr. Farr, in 1847, the firm became Powers & Weightman, which name was retained until the beginning of the present year.

The death of Mr. Powers occurred in 1878, whereupon Mr. Weightman, in addition to his duties as a chemist, assumed charge of the commercial interests of his house. In 1883 Mr. Weightman admitted into partnership his two sons, Dr. John Farr Weightmann and Dr. William Weightman, both of whom died a few years afterwards. In 1893 Robert J. C. Walker, Mr. Weightman's son-in-law, was admitted as a member of the firm. Upon Mr. Walker's death, in 1903, his wife, Anne M. Weightman Walker, succeeded to membership in the firm, she being the only daughter of Mr. Weightman, and upon the death of the latter she became the sole member of the firm until its consolidation with the firm of Rosengarten & Sons recently.

To give a biographical sketch of Mr. Weightman is almost equivalent to giving a history of the chemical manufacturing industry in this country. His firm early became known for the introduction of new chemicals and for the development of processes of manufacture. In 1875 the Elliott Cresson gold medal was awarded them by the Franklin Institute "for the introduction of an industry new in the United States and perfection of result in the product obtained in the manufacture of citric acid." The same medal (which is but rarely conferred) was also awarded them "for the ingenuity and skill shown in the manufacture and for the perfection of workmanship displayed in the production of the cheaper alkaloids of the cinchona barks." It was entirely due to the efforts of this house that sulphate of cinchonidine became so favorably known and so largely employed as an efficient substitute for quinine, at a time when the high price of the latter largely restricted its use. (See editorial in AMER. JOUR. PHARM., Vol. xxvii, 1855, p. 573.)

It is not too much to say that in the number and excellence of their products, this firm is the equal of any in the United States. It is nearly fifty years ago that one as eminent as Professor Procter referred to "the deservedly excellent reputation" of Powers & Weightman. (See AMER. JOUR. PHARM., Vol. xxvii, p. 480.)

The success of the firm was largely due to the eminent traits which marked the character and life of William Weightman, who gathered around him competent men who were trained in an atmosphere of correct business principles, and who, because of the equita-

ble consideration given them, became devoted to the interests of the firm. Probably one of the best indications of the integrity of the firm of Powers & Weightman is to be found in the statement made in connection with their exhibition at the Columbian Exposition. It was stated that "the exhibit made at the Columbian Exposition is not entered for competition, but is simply a transfer from its store-rooms of some of the leading productions of the house, without any special selection, and just as they are being shipped daily. No effort has been made at display or elaboration, but purity and excellence is the standard upon which their claims to merit are based."

In short, Mr. Weightman's career was a remarkable one. He was a man of unusual industry, eminently just in all his transactions, and held to an unusual degree the esteem and loyalty of his employees, many of whom virtually spent the greater part of their lives in his services.

Mr. Weightman was married in Christ Church, Second Street above Market, Philadelphia, on March 17, 1841, to Louisa, daughter of Joseph Stelwagon, of Philadelphia. Besides being a member of the Philadelphia College of Pharmacy, Mr. Weightman, at the time of his death, was also a member of the Historical Society, the Horticultural Society and the Franklin Institute.

Mr. Weightman died on August 25, 1904, after a short illness, and the funeral services were held at his late home, "Ravenhill," in Germantown. He is survived by his daughter, Mrs. Anne M. Weightman Walker, whose only child died a few years ago, and six grandchildren, Mr. Aubrey H. Weightman, Mrs. Richard W. Meirs, Mrs. John Strawbridge, Mrs. Nathaniel Norton, and two unmarried granddaughters.

ETHICAL PHARMACEUTICAL PRACTICE AND ITS RECOMPENSE.

By Henry P. Hynson.

In this day and for this generation, it is difficult to persuade oneself that he may, with propriety, trespass upon the time and patience of any audience touching a special subject that has been thoroughly discussed and variously treated. In this instance especially, as nothing new or helpful can hardly be offered, an apology must be made; an excuse must be given for such a trespass. Your complimentary but rather reckless invitation is my apology; a

burning desire to contribute a mite, as modestly as may be, toward the proper placing of an honorable and useful calling that is generally misunderstood and usually undervalued, is my excuse.

It seems quite meet and right that this venerable institution—the Philadelphia College of Pharmacy—the veritable cradle of American pharmacy, should, in turn, become also the reform school of its larger grown and, oftentimes, wayward offspring. Commendable indeed is the spirit here present, which has fostered this series of meetings, all leading, as they do, towards what I shall again and again style, "the proper placing of pharmacy." Yet, of all the splendid work done by this college, nothing, it appears to me, is more creditable than is the persistent maintenance and successful conduct of the AMERICAN JOURNAL OF PHARMACY, which now, as always, stands out, in precept and example, for clean, dignified, ethical practice.

Lately we have been told, by one whom we are all pleased to honor, that years, accumulated years, modify the minds of men and, although it has appeared unwise to attempt to state just how or where this modification applies, it is quite safe to own, for oneself at least, that years plainly tell us our faults, our shortcomings, our limitations, and it will be quite discreet to assert that these same years, while pleasantly softening our criticisms of others and lending excuses for the acts of individuals, intensely emphasize principles; principles which mercilessly disregard individuals and stand as firm and fixed foundations upon which are builded all laws—natural, common and statutory; principles which are, without doubt, the basis for social laws that we call ethics. Please let it be understood, then, that respect for principles, like devotion to law, need not, as it does not, lessen our sincere regard or respect for individuals and their personal doings.

Ethical pharmaceutical practice may, aye, must be, looked at from three points of view, which offer considerations bearing upon the relationships between pharmacist and client, pharmacist and brother, pharmacist and physician, respectively. If he will, one may contemplate this practice in direct line from his one chosen viewpoint; such a contemplation, however, is difficult. It is the blended picture that is most engaging; beautiful from any observatory, if properly colored with pride, honor and generosity, while all are softened by the exquisite tints of "The Golden Rule."

That pharmaceutical practice is not and never has been just what those most concerned would have it be and that it has seldom had satisfactory recompense may, I believe, be safely stated. This admitted, and being allowed to call this practice—Pharmacy—the question naturally follows: Where should pharmacy be placed?

The more ambitious, those who would have it in a position to better advance science—another name for Truth—better serve the afflicted and to better honor its practitioners, answer that it should, in the days to come, as early as it is fit, become a special branch of medicine with the same ethical laws controlling it that apply to the several specialties in medicine. Then its services, alone, would be recompensed and the means of service would be but incidental. That would, indeed, be ideal and the attainment of the ideal is the end! The less radical and, possibly, more practical, would have pharmacy an allied profession to medicine, like dentistry; that would be very desirable, but the future of dentistry, surely, is recognition as such a special branch of medicine! The conservative, non-speculative, will say: Let it be just what it is, a double-faced thing; a profession in so far as it must be sufficiently learned in the sciences and trained in its special art to render professional service in numberless and important requirements; a trade, whenever it must or may furnish as much or more of whatever is demanded, that may be safely supplied without special learning. Very practicable and entirely possible, but it is not the *smaller* demands upon the strength of man that make him most useful and win for him the greater recompense.

Although both practitioner and trader, who shall say the practitioner shall not be placed in the light—high, clean and dignified? And the trader; shall he not also be in the light—high, clean and dignified? The same conscience should pervade both trade and profession; the same desire to be honest and truthful; to be helpful, dignified and consistent, should be characteristic of both—profession and trade. Being thus possessed, they could, indeed, "lie down together," and the one could not detract from the other. Dissect, if you will, carefully, intelligently, the ethics of professions and the ethics of trades, and when you are ready to report tell me, if you can, wherein the organic differences may be found?

It does not appear that, with respect to his clients or customers, the ethics of the pharmacist are at all different from those of any

other professional or business person. If a fool, a knave or a trickster, he is not within the control of ethical laws; but if competent, honest and faithful, he will make no mistake for which an honorable and dignified excuse cannot be given. With respect to the relationship to his fellow pharmacist, there can be no possible mistake made by him, if, diligently striving to learn what is usual, what is generally acceptable, he stands ready to give all that he might expect; if he expects no more than he stands ready to give.

The picture then revealing pharmaceutical practice in its various relations to the practice of medicine would seem, just now, the one of peculiar importance, and, in view of what has gone before at these meetings, the one best suited to illustrate the points I hope I shall be able to make. Should it occasionally happen that glimpses of one of the two other views are obtained, they should serve to prove there are but few principles underlying life's service that may not be made applicable to all its phases.

In nursing the hope that the ideal placing of pharmacy will finally prevail, it should not, indeed it must not, be thought that in any degree I undervalue the peculiarly honorable and revered position held by medicine. Neither is pharmacy envious or presumptuous; it waits, must wait; but in the end mighty truth must prevail, no matter what the end may bring. So must it be acknowledged that the three great professions are not alike in the exercise of their functions. All, as I understand it, aim finally to protect the bodies of men. Theology and law professionally, always indirectly, through man's senses; while medicine, excepting its rarer and less creditable practices, proceeds to act directly upon the body. The latter, then, is generally substantial and, like pharmacy, has to do with essentially material things.

Just at this point I imagine *you* are wondering when I will depart from generalities and present something tangible for your consideration, while *I* am, in turn, wondering what radical reforms you are expecting me to suggest and what decided changes you think I will advise. Remember, it was but a "fly in the ointment of the apothecary" that caused it to give off unpleasant odors. Those who practise the art of garbling—and it is a most profitable art to practise—will at once appreciate how small the loss of material, how little the sacrifice of time required to greatly enhance the value, to make almost perfect the substance treated.

"The little more and how much it is,
The little less and what worlds away."

I believe it can be successfully shown that in the large majority of our better pharmacies the changes required and the sacrifices necessary to make them entirely acceptable to the masses, the reasonable members of the medical profession, would be very few and immaterial. And why should they be acceptable to the medical profession? may be asked. I answer that a pharmacist who for cause is not in touch with the medical practitioners around him has lost his true mission. He is as much unlike the real pharmacist as is the ostracised medical man unlike the ethical physician; as unlike his acceptable brother as is the disbarred lawyer unlike the recognized attorney. The feeling that would lead us to disregard the good will, endorsement and confidence of medical men must be closely akin to the feeling that leads the advertising specialist to become a world unto himself—a feeling for which the supposed or real faults and objectionable practices of a few medical men offer no reasonable excuse.

Assuming the possibility of pharmacy at last becoming a special branch of medicine, or even an allied profession, what would it cost?

Let us picture, if possible, one of medicine's most distinguished and respected branches, surgery, and, if not presumptuous, see if we cannot from it, sketch the outlines of pharmacy as we would most like to find it, at the same time discovering some of pharmacy's present greatest defects. The physician who elects to practise surgery acquires, of course, a general knowledge of medicine, but secures a special knowledge of those subjects with which his art has most to do: anatomy, histology, the pathology of surgical diseases. Having become learned in the sciences he begins to practise the art, until he is proficient also in that.

Enjoying this proficiency in both the science and art of his specialty, he judiciously selects a location with due regard for convenience and prominence. Next he seeks to fully and properly equip himself. His reception rooms may be elegant with handsome furnishings, but yet are neither gaudy nor extravagant. No matter how attractive they may be, they will be inexpensive and altogether incomparable in detail and exactness with his operating room. To the light and capacity of this operating room all other considerations will be sacrificed; the equipment of utensils, appliances and in

struments will be modern, of the most approved type, and ample. Great care will be exercised in the selection of assistants and attendants; there will be several classes, but each class will hold its competent and trustworthy *personelle.* He is known to be competent, practised, well situated and properly equipped. From whence will his patients come? We all know, from two sources; the one helping the other. But if it happens he decides to do general practice in connection with surgery, there will be but one; he may expect to depend upon his own efforts and his own cases for success. It may not discredit him to do general work; but will he ever become a leading or quite so proficient surgeon? Should he indulge in misleading practices, pretend to possess unusual and secret means or knowledge, he will soon lose caste and be quickly relegated to his rank. He will be allowed to furnish material incidental to his practice, and although it may not be directly charged for, it will enter as a charge with services, "operating room, $10" it reads, or "including charges for dressings, ligatures, ether." He may with propriety sterilize dressings, prepare ligatures, examine anesthetics. Indeed, he may have a hospital or sanitorium of his own, and charge for the board of his patients. All this he could do with perfect propriety. He could own a farm, make an occasional deal in real estate or take "a dip" in wheat without sacrificing his professional standing. But *what would* be thought of him if he were to run an ice cream and confectionery saloon, with cigar stand and pool room attachments, in connection with his sanitorium? What would be thought of him if, when a patient is sent to him by a general practitioner for surgical treatment, he is willing and anxious to treat him for all other ailments and at all times, which willingness he expresses through conspicuous cards generously distributed around his waiting room. And, infinitely worse, if he should prescribe for a price any old advertised appliance, bath or treatment, about which he knew nothing, or which his very attainments told him were worthless. Oh, brothers, the cases are sadly parallel! We need not cut out side-lines if in carrying these our self-respect and personal dignity do not suffer and the attention they require does not too greatly interfere with the more serious demands of our practice. We may invite, if we will, the heavy, sickening odor of the burning Havana or the annihilating fumes of the scorched "Sweet Caporal," both very hard to bear by the delicate young woman

waiting for the prescription to relieve that dreadful sick headache. We may thrust upon the aching heart of the languishing little one's parent, the titter and nonsense of the soda-water girl and dude, while he patiently waits for the hope-giving potion. These are personal privileges, the right to exercise which cannot be disputed, however much the policy may be questioned.

We cannot, however, as fair-minded, intelligent persons, knowing how difficult it is for the learned and skilled physicians to properly diagnose and treat diseases, undertake this service, even if the fair law of reciprocity does not appeal to us. And more, we cannot and must not, knowing, as we do, as we are trained to know, the absurd claims, the falseness, the impudence of quackery, of quack medicines, "patent medicines," if you will, lend our services, our vocations, to their imposition upon, as to them, a poorly-informed, a credulous, a long-suffering public. Nor should we lend our associations and our journals to their pernicious influence. They are not worth it, even in dollars and cents, and no amount of organized work or effort will ever make them worthy the recognition of so useful, so honorable a vocation as is our own.

In the light of all I have ventured to thrust upon you, and in the better light of your own conclusions, I would like to question as follows:

(1) Are not pharmaceutical ethics and the ethics of all other useful vocations built upon exactly the same foundations, and are they not quickened by exactly the same spirit?

(2) Are not the ethics of the pharmacist touching himself personally, his fellows, medical men and his customers, the ethics of the man, of humanity, the gentleman of honor and the accepted citizen of a Christianized community? And—

(3) Does it not appear that when the pharmacist has become ethical, he may become, in fact, has become, very nearly professional?

It may be asked: Why should we be subservient to these laws? The answer is simple: it is because they are the laws of right, of truth and of justice. Even though you may have a birthright in the Kingdom, that birthright cannot be maintained except by obeying the laws. Remember, *entree* into even the smallest social coterie is through and by its laws and affiliation therein, is continued only so long as these laws are obeyed, which, to obey, you must know and understand. While so great an ethical authority as

St. Paul wrote, "I had not known sin, save by the law," he has not said we may escape its condemnation, nor has he promised us recompense for its non-observance.

Undoubtedly, ethical pharmaceutical practice can proceed only through a knowledge of pharmaceutical ethics, and a more perfect knowledge of these can be best obtained by gathering and discussing the views of individuals. I trust not to appear cynical when I express the belief that it is to a desire to get my interpretation ot these laws only, that I owe the honor and pleasure of appearing before you this evening; believing this, I must ask pardon for treating the subject more fundamentally than was desired, perhaps. I have taken this liberty that you might better understand "the faith that is within me" and appear more reasonable when I say of the pharmacy of to-day:

That it should be dignified and somewhat office-like in appearance, with ample space and equipment for pharmaceutical manipulations.

That in the arrangement and display of stock, the form and character of advertising, in advertising devices, it should conform to the importance and seriousness of its mission.

That supplying medicines, medical and surgical accessories should be emphatically paramount, distinctly evidenced, and, instead of irrelevant side lines, should be extensively carried, all such articles as are peculiar to sick-rooms, hospitals, physicians' offices and their laboratories.

That competent and conscientious care, conformity to modern, intelligent, and accepted practice, should rule its policy and conduct.

That in it no attempt or desire to usurp the functions of the physician should be found; no specifics prepared or supplied, and, by all means, no article of medical nature sold, upon the responsibility of the pharmacist or the customer, about which there is the slightest secrecy and for the reliability and safeness of which the pharmacist could not vouch.

This, then, is ethical pharmaceutical practice, without great revolution but in the line of possible and healthy evolution, with but little sacrifice and at small loss.

Its recompense! What is its recompense; what in dollars and cents? Will it pay? will be, no doubt, asked. Yes, it will pay. It has paid in larger proportion to the amount invested than has the conventional

pharmacy, and the percéntage of failures has been much smaller than with these. A business started in the midst of successful and long established competitors, with such competitors ever present, that can, in its fourteenth year, if it does no more, comfortably maintain a firm of four members and pay holding salaries to a corps of twenty employees; that closely approaches 50,000 as the number of prescriptions filled, *annually*, may be thought to pay in dollars and cents. The character of this business is such as to lead customers to think that you must and do charge more, and they are willing to pay good prices; they are not attracted to such pharmacies by low prices. This money recompense, while necessary and desirable, is really incidental and not peculiar either to ethical conduct, or the reverse; some make the conventional pay, some do not; some will succeed along restricted lines, some will not. Many quack doctors make money—many qualified ethical physicians fail to make a living. Money making and money saving is something peculiar to itself and invariably follows no profession, no business. It is an individual characteristic, the dimensions of which are poorly understood, even by its owner; certainly, it should not, must not, influence our ethics.

Unquestionably the greater recompense comes through increased self-respect, through greater pride in our vocation, more interest in our daily work and through the consciousness of having done "our little best" for humanity, for ourselves and those who are to follow.

Peculiarly grateful is the recompense that comes from the community and our patrons. It is fortunate when you can do the best in the best way and for the best reasons—such wins its own compensation, while relief from many trifling annoyances, the absence of distracting, petty demands, leaves one with more to think of that is pleasantly uplifting.

The most pronounced and most unusual recompense that comes to us through this practice is the very encouraging and stimulating recognition it wins from the medical profession and the good feeling it therein engenders. It is really worth the while, with excuses unnecessary and apologies out of place, self-respecting—you command respect—realizing that to him, only, cometh "that peace of mind which passeth all understanding;" to him, only, who follows the broadest, the best and most effective of ethical laws; who does unto others even as he would have them do unto him.

PROFESSIONALISM *VS.* COMMERCIALISM IN PHARMACY.

By William C. Alpers.

The conflict between commercialism and professionalism in pharmacy is an old one—as old as pharmacy itself. While in many European countries it has long been settled in favor of professionalism, it is far from being solved in our country. During the last ten years pharmaceutical conditions in the United States have reached what may justly be called a crisis. A revolution almost is taking place, and nobody can foresee the outcome. Of late years the tendency has been to push commercialism to the front, direct all efforts to reforms on strictly commercial lines and let professionalism take care of itself. There are even many voices heard condemning professionalism as the source of our difficulties, and advocating its total abolishment from pharmacy. Luckily, in all extreme measures a reaction is bound to set in, and the signs are numerous that professionalism will soon get the upper hand in pharmacy.

In order to compare the two sides of pharmacy, and try to find a harmonious and satisfactory link between them, let us first clearly understand what we mean by the two terms, professionalism and commercialism. Professionalism, according to our dictionaries, is a vocation that involves a special education and mental rather than manual labor. Commercialism, however, is the spirit of commerce, an exchange of goods. If therefore we speak of the profession of pharmacy, we thereby imply a special training of the mind, an education beginning at the lowest step and gradually leading up to what is collectively called pharmacy. For it must not be forgotten that pharmacy as a profession is not a science in itself, but rather the combination or chaining together of certain branches of different sciences. A scientific pharmacist, in the widest sense of the word, would have to possess a much broader education than a chemist, a botanist, a physician, or a microscopist. But even if we restrict the word to our daily vocation, a wide range of knowledge is necessary which by its very nature must at once raise its possessor above the ordinary commercial man.

The commercial man has little to do with education. It is practical experience and a keen perception and exact knowledge of goods that make him successful. He may be able to determine at

a glance whether a bale of drugs, like sarsaparilla or ipecac, is of good or poor quality. He does not bother his mind with the question whether the drugs under consideration contain an alkaloid, an oil, or a resin; whether they are poisonous or salubrious. His experience tells him that they are good objects for commercial enterprise, and in this sense alone he is interested in them. The pharmacist looks upon his goods from a different standpoint. The questions that are uppermost in his mind in handling the same articles cannot be solved by practical experience. Their answers are based on knowledge, on education.

To say, therefore, that education in pharmacy is an unnecessary thing means retrogression. The advancement of the human race is based on education, on enlightenment, and the repudiation of any established science by its disciples is indirectly a step toward barbarism. To wipe out the educational part of pharmacy would be to wipe out pharmacy itself. It would mean to divest a growing and beautiful plant of its leaves and flowers, leaving the bare stem as a monument of folly and destructiveness.

We arrive at the same result if we commence our argument from the opposite end. What is a pharmacist? The answer is: a person skilled in the art and science of compounding and preparing medicines. He is not simply a thoughtless mixer of different materials, and the compounding of medicines can in no way be compared to the mixing of mortar, or the mixing of oils and paints. The very definition of the word implies education. But to the public and in law it implies more. It is the established principle in all civilized communities, that the pharmacist is responsible for the quality of his goods, and that he is, and must be, a judge of what is good or injurious to the health of his clients. Nobody expects any responsibility from the purely commercial man. If the bale of ipecac that he sells turns out to be of inferior quality, the buyer claims a proportional credit—which is generally granted—and the transaction ends. But if the pharmacist dispenses a preparation of ipecac that by inferiority or faulty compounding causes injurious results, he is held responsible in every direction, and he may not only be sued for damages, but also held criminally. In our own ranks, the men who for the last five years have worked very faithfully for the elevation of the commercial side of pharmacy, almost to the exclusion of all professionalism, have yet unconsciously

acknowledged that professionalism is, and must be, the foundation of pharmacy; for the profit that they claim and try to obtain on certain goods far exceeds the just rewards of commercial enterprise, and can only be explained and maintained from a professional standpoint.

The public finally give proof every day that they look upon pharmacists as men of higher education, and apply to them for information in many instances where knowledge of chemistry, hygiene, botany or materia medica is presupposed. That these demands of the public are sometimes carried too far and may become sources of annoyance is probably true—but we should not forget that this confidence put in our knowledge and judgment, if properly answered and encouraged, will, by the very nature of our dual position, give us more than mere mental gratification, and lead to increased activity in prescriptions and other professional work.

Thus, whichever way we look, professionalism is the very backbone of pharmacy, and should therefore have the first consideration in all our doings and enterprises.

In carrying out this principle we must not forget, however, that a drug store is a poor place for mere hypothetical speculation; nor can a strict carrying out of a theory, however beautiful, be a successful vocation. The claim that we study pharmacy, and conduct pharmacies, for the sole purpose of advancing science or gratifying our desire for higher education may justly be called an absurdity. We are in business for the sake of profit. We must make a living and feed our families. But this merging of the prosaic demands of stern reality with the higher ideal of a professional calling is not restricted to pharmacy alone. Every professional man has to face the same dispute, and must find a way to harmonize the ideal with the real. Nor must we forget that this is not an age of abstract speculation, and that the tendency of the times points toward an immediate and quick application of all scientific discoveries. Whatever new is invented or discovered in any science, and particularly so in medicine and chemistry, does not long remain the property of some scientists who keep it like a jewel in a forbidden shrine. No, it becomes at once the common property of the whole world; every man of intelligence reads about it, and commercial enterprise at once takes possession of it. Thus science or professionalism and commercialism or practical application run together, and it is almost impossible

to draw or find the line of demarkation. Let us apply this general observation to medicine and pharmacy. The principal aim of medicine of to-day is not directed to combat disease by ordering remedies, the tendency is rather to *prevent* disease, and hygiene and sanitation have become such important branches that they form almost a science by themselves. And here arises at once the demand for an innumerable number of articles and apparatus tending to promote hygiene and sanitation, and it is natural that the pharmacist should supply them. It is, for instance, quite natural that where antiseptics and prophylactics that are used and ordered for the purpose of sanitation, as mouth washes and other dental preparations, are sold, also the articles for their application, as tooth-brushes, etc., are kept; or to step from dermatological preparations to brushes, combs and similar implements. Aromatic liniments may without strain of argument lead to perfumery, and new methods in practical medicine to a large number of sundries, as electro-batteries and various glassware. All these appear like natural and legitimate side lines, and even the strongest advocate of professionalism cannot exclude them entirely from his pharmacy. But they should remain what they are—side lines, not principal lines—and their handling, as well as the whole arrangement of the store, should be managed accordingly.

The history of civilization shows us that wherever it became necessary that people of different degrees of civilization lived together, the inferior race must yield to the more enlightened one. Superior education will enforce its demands in every instance, if necessary even by brute force, in order to elevate the lower race. When the opposite takes place and higher civilization succumbs, we have a retrogression to barbarism. Applying this general observation to our little sphere of pharmacy, we must let professionalism take the lead. We can never consent to arrange our professional calling as a mere commercial practice. Our aim must rather be to elevate the commercial part of our vocation and make it subservient to professionalism. And it can be done and has been done. It is a fact that since the time of the present pharmaceutical crisis the complaints about unbearable conditions have come mostly from the so-called commercial pharmacists, while the professional man has complained little, if at all. He is not blind to existing conditions—as is so often claimed—but rather by prudent foresight and keen per-

ception he recognized the fact that pharmacy based on commercialism cannot prosper, and his aim has been to elevate the desirable side-line, and strengthen his position with the medical profession as well as the laity.

Let me use a metaphor. A strong and vigorous man enjoys the freshness of the water of the Niagara River above the Falls. He is a good swimmer, he knows his surroundings, no idea of danger ever enters his mind. He has done the same for years. Then one morning, venturing out further toward the Falls, he discovers that he is gently carried off by the current. "I must turn around," he says to himself, and he does. But has he become weaker than in former days, or is the current stronger? for he is slowly but surely being dragged toward the Falls. His feeling of safety leaves him. For the first time in his life he feels that he has made a mistake, that he cannot depend on his own resources. He looks around for assistance, but there is none. The banks of the river are far from him on both sides. The rushing of water drowns his voice, and there he is, in the midst of the irresistible, constant current. His apprehension turns to fear. How can he save himself? Already his strength is leaving him. In a few minutes he will be beyond the hope of rescue. In this state of mind he sees not far from him a raft. With the last remaining strength he swims toward it, he climbs on it. "I am saved," he shouts and lays on it exhausted, but in the ecstasy of joy. And more than this, on the raft he discovers many treasures, precious stones and bags of gold. "What a find," he cries, "how lucky I did not reach the shore in time." After the first fulness of his joy he again looks around. Is he really safe? He discovers to his dismay that his rescue is only seeming, for the raft and treasures and rider are still in the current, and slowly moving toward the Falls. But there is help from another quarter. On the bank he discovers some friends. They motion to him; they show him a rope. At a favorable point they throw it to him. "Now I am safe," he cries. Eagerly he grasps the rope. He pulls at it in his excitement; but, alas, it is too thin and weak to stop the momentum of the raft; it breaks and leaves him helpless again. His fright approaches despair. What shall he do? Again his friends motion to him. Now he understands. The rope is thrown again, but this time, instead of trying to carry the heavy raft with him, he ties the rope around his waist, takes a few of the treasures

that are not too heavy, then bravely plunges into the water, and with his own great exertion and the help of his friends, he reaches the bank in safety.

Here we have the pharmacist who some day discovered that the quiet enjoyment of his business has been interrupted and that he is carried to financial ruin. His own efforts of former days fail. He climbs on the ra't of commercialism that seems to give him safety and promises golden treasures; but he discovers that still he is in the deadly current. Then his friends throw him the line of professionalism. It is not strong enough to pull the clumsy raft, but it is strong enough with proper guidance to save him alone if he will add his own efforts; yea, he may even carry some of the treasures along. Shall we stubbornly stick to the heavy raft of commercialism and be carried down the falls? or shall we bravely plunge again in the river of pharmacy, use our own efforts strenuously and with the gentle guidance of professionalism be saved?

The advocate of professional pharmacy is often called an idealist, a visionary, who shoots far beyond the mark and fails to recognize the cold facts of the world around him. In reality it is the idealist who sees clearly beyond the narrow circle to which he is confined. It is the very keenness of his vision that makes him attack and reject conditions around him which others deem unalterable, and while he may sometimes underrate the difficulties of reform, he yet points a way in the right direction. There never was a great man without an ideal. It is necessary to have higher inspiration in order to rise above the ordinary, and this inspiration is generally transposed from the leader to his followers and is able to carry a whole nation to nobler aims. Without an ideal there would be no civilization. Without an ideal there would be no progress, no reform. Without an ideal there would be no art, no music, no greatness. Let me put before you the often cited instance of the artist who looks in ecstasy at a block of snow-white marble. "How wonderful," he exclaimed. "See the grandeur of perception, the beauty of the face, the harmonious lines of the whole figure." "What are you talking about?" asked his neighbor, "I see nothing but a mass of stone." "Yes," replied the artist, "there is some stone about the statue, but give me hammer and chisel, so I can cut it away, that the whole world may see the statue in all its beauty."

Let us in the same way look at pharmacy as an accomplished

piece of art. Do not cut up the block of marble for commercial paving stones. Let us take hammer and chisel and work faithfully from morning till night until professional pharmacy stands before us perfected in all its glory.

THE EVOLUTION OF NOSTRUM VENDING AND ITS RELATION TO THE PRACTICE OF MEDICINE AND PHARMACY.

By George M. Beringer.

The term "nostrum" correctly used is restricted to "a quack medicine; a remedy, the ingredients of which are kept secret;" but the discussions in some of our pharmaceutical meetings, as well as popular usage, have included under this title all proprietary remedies. A shade of authority for such usage and broadening of the meaning of the term is given in the Century Dictionary and Cyclopedia, where the derivation of nostrum is given as "L. nostrum, neut. of noster, our, ours." The name is supposed to refer to the habit of quacks and other advertisers of claiming special virtue for their wares as "our own make."

While fully recognizing the difference between the terms "nostrum" and "proprietary remedy" when properly used, the writer may in this article, following the example set in these meetings, use the terms as synonymous.

We must admit that, at the present time, a large portion of the trade of the average American pharmacist is in this class of medicines, and that even in prescription compounding they have become an important factor.

Some of the writers on professional pharmacy, who have very exalted ideals, have considered these as entirely modern innovations in medical and pharmaceutical ethics, and lay an undue share of the blame at the door of the drug trade. They are prone to moralize about the happy trade conditions of the past decades, when the present generation of duggists were in embryo and the devotees of the calling, whose reputation we honor, were practising pure professional pharmacy.

A retrospection of the history of medicine in this connection, even though, necessarily, quite cursory, may not be unprofitable. Among the ancient Greeks the treatment of disease was largely in the nature

of a worship of Asclepius (Æsculapius). The patient after preliminary ablution, prayer and sacrifice, was permitted to sleep at the feet of the statue of the god, and in his sleep the proper remedy was revealed in a dream.

The Egyptian practice of medicine was mainly in the hands of the priests and astrologers, and the compounding was done in the most secret manner.

The various schools and systems of medicine throughout the period of Roman supremacy were likewise a mixture of which superstition and religion were prominent components.

In Germany, despite the spirit of reform and the revolution of the practice introduced by Paracelsus, no real advance was made until comparatively modern times. Even his early training was tinctured with the prevailing theory and search for the Philosopher's Elixir. His peculiar visionary theories regarding the composition of the body and its relation to nature and disease had but few advocates, and he himself was considered by many to be only a sorcerer and impostor. His study of nature was directed principally to gathering together facts and information regarding the action of mineral or chemical drugs. While advocating the use of chemicals, he did not entirely exclude the vegetable remedies, and he will ever be remembered as the originator of tincture of opium and the common name laudanum, which it will always retain. His work can be considered mainly as a search for specifics, and many of his followers are said to have rapidly degenerated into mystical quacks and impostors.

The work of the alchemists who devoted their entire lives in persevering researches in the hope of discovering the Elixir Vitæ and the Philosopher's Stone have left their indelible impression upon the practice of both medicine and pharmacy. Their progress, however, was likewise through the sea of mysticism, and their extensive processes in many cases but attested their ignorance of real science, and their nostrums were purposely shrouded in mystery as deep and black as their own art.

In the Middle Ages the monasteries were the chief homes of medical learning and the practice was a mixture of superstition and religion with such relics of knowledge as had been preserved from the early Greek and Roman writers. For centuries some of these monasteries were noted for the medicines which they prepared, and their secret remedies were sold and exported in every direction.

This practice was continued until quite a recent date and may not, even now, be altogether discontinued. A number of the nostrums so introduced have become popular household remedies.

Throughout the ancient and mediæval periods, there was such a close relationship between witchcraft, divination, magic and spiritualism and medical practice, that it was difficult to tell where the latter commenced and the former terminated. The practice of medicine and of astrology was quite commonly united by the same learned individual. The tendency to associate the practice of medicine, and especially the action of drugs, with mystery and religion has been apparent throughout all periods, and has its modern parallel and reproduction in the Christian Science treatment of the present day.

The history of the practice and the development of pharmacy in England has been faithfully portrayed in "Progress of Pharmacy" by Bell and Redwood, and the writer has taken the liberty of abstracting freely therefrom. In that country, the earlier records show that the practice of medicine was in the hands of the physicians, who prepared the medicines themselves or superintended the preparation of them. The science of medicine was so little understood and so imperfectly cultivated that it was in general practised empirically and was often confounded with sorcery and witchcraft, and this common confusion was said to have lasted until the sixteenth century.

The apothecaries were originally the physicians' assistants, but gradually acquired some knowledge of drugs and began to transact business on their own account. The first act to regulate the practice of medicine was passed by Parliament in 1511. This act provided for the examination of physicians practising in London by a Board composed of the Bishop of London or the Dean of St. Paul's and four physicians. In 1542, an act was passed which was aimed against the empirics and likewise to prevent surgeons engaging in the practice of physic, and under this and subsequent acts a number of quacks and nostrum venders were prosecuted.

It is uncertain at what period in English history the physicians gave up the practice of preparing their own medicine. The apothecaries were first separated from the grocers by a charter obtained in 1617. It was then enacted that no grocer should keep an apothecary's shop, and that no surgeon should sell medicines. Similar

legislation in America, at the present time, would be a boon of inestimable value to professional pharmacy.

The real modern advance in pharmacy in England and in all English-speaking countries, dates from this charter. The first step towards reducing the processes of pharmacy to a regular standard for the guidance of dispensers of medicine was the publication of the Pharmacopœia of the College of Physicians of London in 1618.

The medicines formerly employed were complex, heterogeneous mixtures of drugs selected with very little scientific knowledge of their action, and frequently they were therapeutically incompatible. The large number of drugs of animal origin recognized in this pharmacopœia, and in subsequent editions, is only significant of the status of medicine and the trend of medical thought at that time. Snails, vipers, the urine of men and of animals, calculi, the thigh bone of a man that had been hanged, are all examples of remedies extolled as specifics for a variety of disorders. The polygenous character of many of the formulæ given is illustrated by Confectio Damocratis or Mithridatium, which contained forty ingredients, and the Theriaca Andromachi or Venice treacle, which contained sixty ingredients.

In 1650, Nicholas Culpeper published his "Physical Directory, or a Translation of the Dispensatory made by the College of Physicians." In this he severely criticises and ridicules many of the remedies recognized, especially the drugs of animal origin, such as the fat of numerous animals and fowls, some domesticated and some wild; vipers' flesh, brains of a number of animals, excrements of human beings and of animals, and he scarcastically states: "They should have put the rennet of an ass to make medicine for their addle brains." Nicholas Culpeper was himself quite as much of an astrologer as a practitioner of medicine, and his work is not at all free from the prevailing superstition of the age, as shown by the following abstract: "The head of a cole-black cat being burnt to ashes in a new pot, and some of the ashes blown into the eye every day, helps such as have a skin growing over their sight."

The early pharmacopœias were full of substances which derived their reputation from superstition or prejudice, and the impossibility of obtaining many of them undoubtedly led to gross substitution and adulteration, and encouraged secret practices and quackery.

It is not beyond grave suspicion that the sophistry and cupidity

of the makers of nostrums dictated the recognition of such revolting relics from ancient practice and barbarism.

Many of the practitioners of the sixteenth and seventeenth centuries prided themselves on their use of special remedies, and adopted a style of advertising their infallible treatments continued in some quarters even to the present day. St. John Long, who practised as a "consumption doctor" in the early part of the last century, was a noted example of this class. His principal remedy was a secret embrocation which he would not permit out of his hands. The St. John Long's Liniment of the shop is presumably an imitation of the same.

In America it is well known that in the early days of the colonies many of these proprietary remedies were imported, and that quite early in the history of our country records show that the monasteries engaged in the manufacture and sale of such medicines. For some of the popular imported remedies formulas were proposed, and many of the leading druggists engaged in supplying their home trade with products of their own manufacture. Naturally, there was considerable diversity in the recipes and resulting products, and one of the first acts of the Philadelphia College of Pharmacy was to appoint a committee composed of Charles Allen, Daniel B. Smith, Warder Morris, E. B. Garrigues and William Bakes, to investigate the subject and submit satisfactory formulas.

On May 4, 1824, they submitted a report to the College, and their formulas for the following were adopted: Hooper's Female Pills, Andersons Scott's Pills, Bateman's Pectoral Drops, Godfrey's Cordial, Dalby's Carminative, Turlington's Balsam of Life, Steer's Opodeldoc and British Oil. These formulas were published, and modifications of the foreign wrappers printed, and a local manufacturer at once engaged in manufacturing the peculiar vials as used abroad, and thus standard, uniform and satisfactory products of these household remedies became possible. It is worthy of note that such prominent pharmacists of that day considered the subject of such importance and devoted their time and energy to such commodities. At the Semi-Centennial Celebration of the American Pharmaceutical Association (in 1902), in the historical exhibition, Mr. S. W. Heinitsh, of Lancaster, Pa., showed a collection of old proprietary remedies, such as had been sold at the Heinitsh Pharmacy, in that city, and several of these were more than 100 years old.

From this review we are compelled to draw the conclusion that the manufacture and sale of secret remedies has coexisted with the practice of medicine throughout all times. Instead of being a modern innovation, the genesis of nostrum vending probably dates with the very inception of the practice of medicine.

The style and character of such remedies necessarily changes with the changes and conditions of society. At the commencement of the twentieth century, the lovers of the ethical practice of medicine and of ethical pharmacy are confronted by an alarming condition—a condition which has resulted from the continual development of this evil, and is now more apparent, because accentuated by the commercialism and energy of twentieth-century methods. In this generation the newspapers have an enormous influence, and their advertising columns have been a leading factor in the development of this giant evil and the encouragement of self-medication by the public.

The blame, however, cannot be laid at the door of pharmacy alone, but must be shared by both professions. We all know that in recent years a class of proprietaries have been directly offered to the physicians and prescribed by many, that have in most instances but very little to elevate them above the level of the common ordinary nostrums that are advertised direct to the public.

In a recent issue of an American medical journal, which claims to have a very wide circulation and prides itself upon the influence it exerts, the writer counted in the advertising pages, nine remedies for external use and thirty-two intended for internal administration, all under arbitrary coined names, and the advertisements contained nothing or next to nothing to signify their composition. Our prescription files and store shelves show that physicians are prescribing such remedies without having but a very indefinite idea of the ingredients or actions.

The following is abstracted from a recent issue of a medical journal: "Boys, I'm going to give you a prescription which makes the treatment of pneumonia a regular cinch. Put 10 drops of tincture of ipecac and 10 drops of tincture of aconite to 4 ounces of respiton, and give ½ to 1 teaspoonful every two or three hours." Is there a single pharmaceutical journal in America, even among the "house organs," that would lend its pages to such a thinly veiled advertisement and such an undignified appeal to its patrons?

To what, may be asked, can we attribute this tendency among physicians to depart from officially recognized preparations and methods of prescribing? Is it due to any lack of proper instruction in the medical departments of the universities and colleges? It is exceptional indeed to find among practitioners of medicine any great percentage who are proficient in chemistry, and to a still larger proportion, botany is a sealed book. Under these conditions was not the following statement, attributed to a prominent pharmaceutical manufacturer, well founded? "The average physician of to-day gleans his knowledge of Materia Medica from the patent medicine man's circular." It is certain that this lack of acquaintance with Materia Medica is appreciated by the manufacturer of such proprietaries, and his circulars and advertisings are framed accordingly. Of course, some of the remedies introduced as proprietaries have proved to be useful, and the success of such has always had an influence on the practice of medicine and likewise on the pharmacopœias. The present United States Pharmacopœia contains a number of such preparations, which are recognized under official titles and properly used. In the forthcoming edition of the Pharmacopœia, probably under such titles as Liquor Sodii Phosphatis, Liquor Antisepticus and Cataplasma Kaolini, we will discern some substitutes for well-known proprietaries.

It must be acknowledged that the practice of medicine is influenced to a considerable extent by the character of the surrounding community. The practice of pharmacy is still more influenced by the environment, and also by the medical practice of the neighborhood.

There was no marked progress in pharmacy until the advance was inaugurated by medicine, and so in the elimination of this evil the two professions must work together, but it must be apparent that physicians must cease prescribing proprietaries before the pharmacist can cease dispensing the same.

If the commercialism that has marked in many localities the practice of medicine could only be discontinued, and the physicians rise to the true dignity of their profession, how soon would the pharmacists seize the opportunity of elevating their calling and relegating this abominable nostrum vending to ancient history.

There is a great responsibility resting on pharmacy which it must bear independently of that shared by medicine. We are

entirely too willing to encourage every new applicant that comes along to be advertised to the suffering public. Are we, as professional gentlemen, or even only as tradesmen, devoid of moral responsibility when we encourage the sale of nostrums that have the power of creating a liquor or drug habit? Laws should not be necessary prohibiting the sale of morphine and cocaine by pharmacists. Is it not a disgrace to pharmacy to learn that in some localities the Sunday sales of liquid malts, bitters and fake tonics are so enormous? The writer has in mind a remedy that is now being extensively advertised as a specific for catarrh that is simply a spiritous extract of asarum, and containing very little of the latter. Can we conceive that this would prove to be of the least benefit in the cure of such a disease as catarrh. The sale of this nostrum is simply enormous, and are we not justified in inquiring how many drunkards are the drug trade of America thus assisting unscrupulous advertisers in making per annum?

Do the officers of our national association realize the responsibility that they are assuming when they advocate that every retail druggist in the United States must sign contracts to do nothing to discourage the sale of such, and even make himself liable for liquidating damages if he exerises his right of judgment and discrimination against such remedies?

DISCUSSION ON PHARMACEUTICAL ETHICS.

In the discussion following the reading of the three preceding papers presented at the Pharmaceutical meeting, on Tuesday evening, March 21st, remarks were made by

DR. HENRY BEATES, JR.,

as follows:

"While sitting here profiting from the papers of the evening just read, I did not think the pleasure enjoyed was to be interrupted by a request from your honored chairman, especially as I am a guest, to open the discussion.

"I noted down several points, and trust you will not feel that the notes in my hand are so voluminous as to augur an infliction upon you of a long discussion.

"The three papers treated of one fundamental principle, which underlies the correct solution of the profound problems respectively

considered. It is *principle*, after all, which determines action in all pursuits of life, and assumes proportionately increasing value and importance as the vocation of the individual is more or less related to the welfare of those of his fellow beings who necessarily, because of obtaining conditions, patronize him and rely upon him for service.

"The whole matter resolves itself into the one word *character*, and implies, therefore, the *moral* sense of obligation and that conformity therewith which moulds a man's every act into a class belonging to either the right or the wrong.

"What a man does in the struggle for existence, and in endeavoring to provide himself and those dependent upon him with the means necessary for comfortable existence, finds him, as things go, exponent of character, the actions of which are in conformity with what Professor Hynson so forcefully expressed when he said 'Conduct is based upon the laws of right, truth and justice.'

"It is the growth and development or the standard of moral character, therefore, underlying the action, particularly of those pursuing the professions and their art that we represent, which is to be a condition for the success of their highest achievements.

"I am reminded here of that leader in thought of rational medicine who has been so conspicuous in matters pharmaceutical, and who has stood before the medical and pharmaceutical worlds in the light of strong character and as a leader and a giant in progress, Prof. Horatio C. Wood, who defines character as 'an established equilibrium existing between the emotional, the intellectual and the volitional,' and this implies a struggle to maintain the equilibrium, since the impulses originated by the emotional are recognized by the intellectual to belong to either the good or evil, and by a cultivation of the volitional enables the body to control the impulse, instead of the impulse controlling the body, and just as soon as this is established will right action be the result.

"Recompense, if based upon a questionable commercial competition, the outgrowth of oblique methods of reaching the end, never can assume a definite relation between service and reward. Intrinsic values are only established by the honest exercise of intelligence, and when character marks the followers of the science and art we represent, the ethical practitioner, other things being equal, will receive the legitimate and amply compensating reward.

"It is with pleasure that opportunity is given to emphasize the

thought so well portrayed by Professor Hynson, that intrinsic value, that for which the struggle of existence tends, is established by the laws of right, truth and justice. Inherently natural values, therefore, can only be possessed when, after having become established, they are won by men of merit.

"Dr. Alpers speaks of *conflict* in his excellent contribution to this important subject. The *conflict* is, as in other matters of this type, between honesty and dishonesty, right and wrong. Recognizing, as the paper does, that in the processes of superorganic evolution, intermediate conditions, as it were, obtain between existing things and advanced ideals demanding control by law of those who have not yet obtained that degree of character which guarantees right action, and secures to the community dependent upon him safety against deception and fraud.

"His sentence, 'Harmonize the ideals with the real,' suggests it as the chief problem presenting for solution. It is necessary, therefore, for those so happily circumstanced as to recognize this need, to appreciate the fact that there is a principle of common law involved, which is not as fully comprehended or as widely understood as it should be, and, in endeavoring to establish statutory law, opposition is often advanced claiming an unconstitutionality of statute control.

"It is a principle of Common Law, which many years ago was confirmed by the unanimous opinion of the U. S. Supreme Court, that the vocation of any one, upon whom depends the interests of fellowmen, can be controlled by establishing standards of qualification, which every State has a right to do, in accordance with what it recognizes to be just and proper. This important right should be universally recognized.

"The figure of the block of marble, utilized by Dr. Alpers to illustrate the skill, or the science and art which is necessary to cut away that part of the block which hides the perfect statue, the useless or superfluous, the unfit, doubly forcefully impresses these facts upon the minds of those who are considering the momentous problems from the standpoint of necessary and higher ideals.

"The very word *character*,[1] above alluded to, from the verb, charasso,[2] to cut, to sharpen, and its derivative, character, that

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[1] Χάράκτηρ.

[2] Χάράσσω.

which is so sharply defined, and the Greek[1] 'charactera epemballein tini,' to give definite shape, form, outline, to put a mark upon, makes clearer the meaning so beautifully portrayed by the essayist. It is to put in the hands of authority, those who are qualified, the hammer and chisel, the power with which to do away with the superfluous and bring into full light unmistakable, clearly-outlined, well-defined and permanently-established facts or truths. To build up and establish a definite standard.

"Mr. Beringer referred to the far-reaching consequences of the Sea of Mysticism, which doubtless was contemporaneous with the origin of the practice of medicine, and with the preparation of the means used for the cure of disease, deformity and injury prescribed by practitioners.

"The lay mind, in those early days, was permeated with a superstition which made the community 'moldable' to the whim and direction—indeed, the control by the practitioner of anybody who relied upon him for a cure. The same superstition, only partially modernized, rests as a mantle upon the laity of *this* age, and this it is which renders the public *gullible* by the methods of those misrepresentatives of the professions we represent, and takes shape in the form of the *nostrum vender*—both the manufacturer and the seller.

"Indeed, this same *debased* and *unprincipled commercialism* constitutes the *only opposition* to raise the standards of qualification, and to improve and render more efficient the methods of pharmaceutical and medical education.

"The whole matter, therefore, resolves itself into the one simple fact, and that is the establishment and requirement of higher standards of educations precedent to paralleling qualification, and this must be specifically moral, as well as mental and physical.

"As I sat listening to Mr. Beringer and heard him utter a fact, the truth of which cannot be denied, '*that quack nostrums are prescribed by a large percentage of the practitioners of medicine,*' I felt my ears tingle with the blush of shame, because I recognized that this statement was true. The supply largely must equal the demand, and when the demand is of a character to have eliminated entirely this sort of unprincipled patronage, pharmacy will no longer be encumbered with the disgraceful commercial load, nor medicine suffer the blush of shame.

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[1] Χαράκτηρὰ επέμβαλλειν τὶνι.

"Our duty, therefore, is plain, and it devolves upon every one who recognizes the great necessity for having more thoroughly efficient and better qualified practitioners of the professions and their art, which we represent, in order to be able to vouchsafe to fellowman *safety against incompetency and fraud*, and to bring about through individual influence such statutory control as will force the practical administration of the self-evident necessities."

THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION.

By M. I. Wilbert.

The American Medical Association, through its Board of Trustees, has recently instituted a project that if continued and conscientiously carried out, will ultimately result in a marked improvement in the professional status of pharmacists and of pharmacy.

This project, as published in a recent number of the *Journal of the American Medical Association* (March 4, 1905), practically consists of the creation of an advisory board to be known as the Council on Pharmacy and Chemistry, whose purpose it will be to inquire into the composition and standing of the several medicinal preparations of a proprietary character that are or will be offered to the medical profession, and by comparing them to the requirements embodied in a set of ten rules that have been adopted as a guide, determine, so far as is possible, whether or not the individual preparation, and the firm or firms exploiting the same, are deserving of the patronage and confidence of physicians and pharmacists. If no unforeseen obstacles prevent, it is proposed to publish a book entitled "New and Non-official Remedies," which is to contain a list of such preparations as come up to the requirements, with such additional information on the composition, properties and uses of the same as might be considered necessary or of advantage for the rational use and control of the several preparations.

A careful perusal of the appended rules of the Council must convince any reasonable pharmacist that they do not contain any demands or provisions that are in any way inconsistent with the practices of the better and more responsible manufacturers and dealers.

To make the plan effective, however, it will be necessary to secure not alone the endorsement, but also the active co-operation of every honest and ethically-inclined physician, as well as every scientific and up-to-date pharmacist.

The physician must be made to see and to fully appreciate the fact that, unless he is in possession of the amount and the kind of information that will be forthcoming under the rules that have been adopted, he cannot consistently use any given proprietary preparation and do justice to himself and to his patient.

The pharmacist, on the other hand, must be made to see the justice of the position here taken, and to appreciate the fact that the establishment of this Council will enable him, as an individual, to array himself as being in favor of honesty and honorable practices and opposed to secrecy, quackery and dishonest, or at least questionable, dealings in connection with medicines and medicinal preparations. The pharmacist must also learn to appreciate the fact that he, individually, is more or less responsible for the social as well as professional standing not only of himself, but of all others in his particular field or calling, and that he, as an individual, will be classified and judged by the doings and practices of others with whom he associates.

It is greatly to be desired, therefore, that pharmacists of all classes take an active interest in this work, and that after carefully reading the proposed rules they give the Council on Pharmacy and Chemistry of the American Medical Association the benefit of such comment and criticism as they may see fit to make.

That the chairman of the Council, as well as every individual member, will duly appreciate any suggestions and advice is evidenced by the following paragraph from the circular letter recently published in the *Journal of the American Medical Association* (March 4, 1905, p. 719):

"The Council appreciates the importance and difficulties of the work to be undertaken, and does not expect to take a step forward without being sure that it is right and just to all concerned. It does not dare to hope for perfect results, and can only promise to strive earnestly, honestly and impartially to avoid serious errors of commission and omission.

"RULES GOVERNING THE ADMISSION OF ARTICLES.

"The following rules are adopted to guide the Council on Pharmacy and Chemistry of the American Medical Association:

"(The term 'article' shall mean any drug, chemical or preparation used in the treatment of disease).

"*Rule 1.*—No article will be admitted unless its active medicinal ingredients and the amounts of such ingredients in a given quantity of the article be furnished for publication. (Sufficient information should be supplied to permit the Council to verify the statements made regarding the article, and to determine its status from time to time.)

"*Rule 2.*—No chemical compound will be admitted unless information be furnished regarding tests for identity, purity and strength, and, if a synthetic compound, the rational formula.

"*Rule 3.*—No article that is advertised to the public will be admitted; but this rule will not apply to disinfectants, cosmetics, foods and mineral waters, except when advertised in an objectionable manner.

"*Rule 4.*—No article will be admitted whose label, package or circular accompanying the package contains the names of diseases, in the treatment of which the article is indicated. The therapeutic indications, properties and doses may be stated. (This rule does not apply to vaccines and antitoxins, nor to advertising in medical journals, nor to literature distributed solely to physicians.)

"*Rule 5.*—No article will be admitted or retained about which the manufacturer or his agents make false or misleading statements regarding the country of origin, raw material from which made, method of collection or preparation.

"*Rule 6.*—No article will be admitted or retained about whose therapeutic value the manufacturer or his agents make unwarranted, exaggerated or misleading statements.

"*Rule 7.*—Labels on articles containing "heroic" or "poisonous" substances should show the amounts of each of such ingredients in a given quantity of the product.

"*Rule 8.*—Every article should have a name or title indicative of its chemical composition or pharmaceutic character, in addition to its trade name, when such trade name is not sufficiently descriptive.

"*Rule 9.*—If the name of an article is registered, or the label

copyrighted, the date of registration should be furnished the Council.

"*Rule 10.*—If the article is patented—either process or product—the number and date of such patent or patents should be furnished. If patented in other countries, the name of each country in which patent is held should be supplied, together with the name under which the article is there registered."

The following is a list of the names of members of the Council on Pharmacy and Chemistry, American Medical Association:

Arthur R. Cushny, Ann Arbor; C. Lewis Diehl, Louisville; C. S. N. Hallberg, Chicago; Robert A. Hatcher, New York; L. F. Kebler, Washington; J. H. Long, Chicago; F. G. Novy, Ann Arbor; W. A. Puckner, Chicago; Samuel P. Sadtler, Philadelphia; J. O. Schlotterbeck, Ann Arbor; Geo. H. Simmons, Chicago; Torald Sollmann, Cleveland; Julius Stieglitz, Chicago; M. I. Wilbert, Philadelphia; H. W. Wiley, Washington.

This proposed plan, to eliminate secrecy and quackery from the practice of reputable physicians, has met, and will continue to meet, with strenuous opposition and vigorous denunciation from various sources. Its ultimate success or failure will, and must, depend largely on the honesty of purpose, good will and assistance of the pharmacists of this country who are in a position to inquire into, and are in duty bound to furnish information on, the character, composition and nature of the various proprietary remedies that are, or may be, exploited from time to time.

It is virtually impossible that any dozen or fifteen men should be able to command all of the information that will be necessary to properly classify the numberless thousands of remedies and mixtures that are being offered, and to properly safeguard the interests of the public, and of the professions more directly interested, and at the same time avoid any possible injustice to manufacturers, without the active aid and assistance of all that may be interested.

THE RECOGNITION OF THE COLLEGE DIPLOMA.

By Joseph P. Remington.

It would seem to the average man of affairs that the legal recognition of the diploma of a regularly chartered institution should require no special law to give it practical effect, but pharmacy laws

have been in operation in this State for nearly forty years, and although they have proved effective, in a measure, in controlling the practice of pharmacy, it has been regarded by a majority of the members of the pharmaceutical profession that until the diplomas of reputable colleges of pharmacy were recognized, the full measure of usefulness of pharmacy laws could not be realized. The movement which has culminated in the signing by Governor Pennypacker of House Bill No. 167, on March 24, 1905, had its inception at the annual meeting of the American Pharmaceutical Association at New Orleans, in 1891.

At that time the association recorded emphatically its disapproval of any such legislation, the principal objection being that pharmacy was not ready for such an advanced step. But the chief objection came from members of Boards of Pharmacy who attended the meeting. At the meeting of the American Pharmaceutical Association in 1898, this body reversed itself when they passed a practically unanimous vote in favor of the recognition of diplomas.

The record of the Pennsylvania Pharmaceutical Association is that on two occasions it passed, by decided majorities, resolutions in favor of recognizing college diplomas. In this State the first bill to be introduced upon this subject was in 1903, but the effort was a thorough failure, as the bill was defeated upon first reading in the House. In the meantime the pharmacists in New York State prepared a bill which passed both houses, was signed by Governor Odell, and the law became operative January 1, 1905.

The present movement in Pennsylvania began in December, 1904, and resulted in the framing of an Act, of which the following is a copy:

AN ACT.

An Act to amend Section 5 of the Act entitled "An Act to regulate the practice of Pharmacy and sale of poisons, and to prevent adulterations in drugs and medicinal preparations in the State of Pennsylvania," which was approved the 24th day of May, Anno Domini 1887, requiring that on and after January 1, 1906, all persons applying for certificates of registration as competent pharmacists under the provisions of Section 5 of the said Act shall be graduates of a reputable college of pharmacy.

Section 1. Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in general assembly met, and it is hereby enacted by the authority of the same, that Section 5 of the Act entitled "An Act to regulate the practice of Pharmacy and sale of poisons, and to prevent adulterations in drugs and medicinal preparations in the State of Pennsyl-

vania," approved the 24th day of May, Anno Domini 1887, which reads as follows:

Section 5. That it shall be the duty of said Board to meet at least once every three months in the city of Harrisburg, or at such other place as they may deem expedient, and examine all persons who may desire to carry on the business of a retail apothecary, or that of retailing drugs, chemicals or poisons, or of compounding physicians' prescriptions, touching their competency and qualifications, and they, the said Board, or a majority of them, shall grant to such persons as may be qualified, certificates of competency or qualification, which shall entitle the holders thereof either to conduct or carry on the business or to act as a qualified assistant therein, as may be expressed upon the said certificate, and such certificate, together with its renewals, shall be good and sufficient evidence of registration under this Act.

All persons applying for examination for certificate to entitle them to conduct and carry on the retail drug or apothecary business must produce satisfactory evidence of having had not less than four years' practical experience in the business. And those applying for examination for certificates as qualified assistants therein must produce evidence of having not less than two years' experience in said business.

Be and is hereby amended to read as follows:

Section 5. That it shall be the duty of the said Board to meet at least every three months in the city of Harrisburg, or at such other place as they may deem expedient, and examine all persons who shall desire to carry on the business of a retail apothecary, or that of retailing drugs, chemicals or poisons, or of compounding physicians' prescriptions, touching their competency and qualifications, and they, the said Board, or a majority of them shall grant to such persons as may be qualified, certificates of competency or qualification, which shall entitle the holders thereof either to conduct or carry on the business or to act as a qualified assistant therein, as may be expressed upon the said certificate, and such certificate, together with its renewals shall be good and sufficient evidence of registration under this Act.

All persons applying for certificate examination to entitle them to conduct and carry on the retail drug or apothecary business must produce satisfactory evidence of having had not less than four years' practical experience in the business of retailing, compounding or dispensing drugs, chemicals and poisons, and of compounding physicians' prescriptions, and of being a graduate of some reputable and properly chartered college of pharmacy. And those applying for examination for certificates as qualified assistants therein must produce evidence of having not less than two years' experience in said business.

Section 2. That the amendment provided for by this Act shall become operative and in force on and after the 1st day of January, 1906.

Energetic measures were at once instituted to secure the passage of this Act. It will be seen that it is simply an amendment to the present Pharmacy Act, the only change being as follows: After the clause requiring four years' practical experience in the business in the last paragraph of the amended Section 5, these words are added, "and of being a graduate of some reputable and properly chartered

college of pharmacy." Section 2 required that the amendment provided for by this Act shall become operative and in force on and after the first day of January, 1906.

The duty of carrying on the campaign of education, for it was soon seen that this was necessary, was placed mainly upon the Committee of Legislation of the Pennsylvania Pharmaceutical Association. This body most wisely had chosen for its chairman, Hon. John C. Wallace, of Newcastle, Pa. To his knowledge of legislative procedure and intimate acquaintance with the members of both houses, the greatest credit is due for the successful passage of this Act through the Legislature.

The members of the Pennsylvania Association were addressed personally through a circular, and were given definite instructions how to proceed if they approved of the bill. Letters and telegrams in large numbers were sent to the members of the House and Senate and to the Governor. It was soon seen that the sentiment throughout the State was generally in favor of the Act. Upon March 14, 1905, the vote of the House upon final passage of the Act was 147 ayes to 10 nays. The vote of the Senate, taken March 20, 1905, was 35 ayes and no nays. After repeated visits to the Governor, both before and after the passage of the Act by the Legislature, the Committee was rejoiced to find that Governor Samuel W. Pennypacker signed the bill March 24, 1905.

The passage of this bill marks an era in the history of pharmaceutical education in the United States.

AFRICAN BALSAM OF COPAIBA.[1]

By C. M. Kline.

This paper deals with an article of commerce which, although it has figured rather prominently in pharmaceutical literature, has never been accorded a position which is at all to its credit. A glance through the literature of the past ten years shows that it has always been treated with suspicion; generally being referred to as an adulterant.

The pharmacopœias of different nations have in general thrown the weight of their influence against its employment, yet have not succeeded in preventing its use.

[1] Read at the twenty-seventh annual meeting of the Pennsylvania Pharmaceutical Association, June 21–23, 1904.

The British Pharmacopœia of 1898 gives a test to exclude it from use with the other copaibas. "The volatile oil should rotate the plane of a ray of polarized light from 28° to 38° to the left (absence of African copaiba)." The volatile oil of African copaiba, as is well known, rotates to the right; so in defining the degree of rotation it was intended to prevent both the substitution of this article and its admixture. The degree of rotation (28° to 38°) demanded in the above test is too high to include many genuine specimens, according to figures given by many writers and by our own experience; therefore, the degree of rotation must of necessity be disregarded, rendering the test only partially reliable. That portion of the test demanding that the ray be rotated to the left is of value, but would admit the admixture of a percentage of African copaiba not sufficient to deviate the ray from left to right, but only just enough to modify the extent of its deviation.

A sample of a lot of Central American copaiba of very excellent quality, refined by the company with which I am connected, gave a rotation of — 17° 16′. In other samples we have met as low as — 5°. Thus it would seem impossible to define the degree of rotation, and therefore impossible to prevent in this way the addition of African copaiba.

The U. S. Pharmacopœia, either intentionally or otherwise, contains two tests which operate against its use—the ammonia test, and the statement that copaiba must not be fluorescent. The ammonia test is unscientific in that its action is not understood. Pure Para balsam copaiba does not answer this test; and yet we do not say that it is therefore of less value medicinally. If African or Bahia balsams do not answer this test, should they on that account be rejected? Obviously, no; since their insolubility may be due to some perfectly natural constituent not contained in "Copaiba Langsdorffii," but present in some of the "other species of copaiba" admitted by the Pharmacopœia. The statement that copaiba should not be fluorescent should be changed to one of degree of fluorescence, since all the copaibas that have come under our inspection are, at least, slightly fluorescent.

That African copaiba finds its way into our market for illegitimate use is amply demonstrated by the statement of London brokers that enormous quantities have been exported from London to New York. It is not thereafter sold under its true name, and therefore

appears to be used to adulterate other articles, among which may be mentioned ordinary copaiba and peppermint oil. So-called Central American copaiba is being offered on the market at a cost of 10 per cent. less than the actual cost of the crude Central American laid down on dock, New York, although the latter has to be cleaned, which involves a heavy loss, before it can be sent out to the trade. This fact offers a strong clue to the probable destination of the African balsam, as does also the statement of Ernest J. Parry, a prominent analytical chemist of London, who found what he thought to be the essential oil of African copaiba in so-called peppermint oil from New York State, offered on the London market.

My remarks, so far, refer to the abuses of African copaiba which have caused it for the past ten or twelve years to figure in an unfavorable light. My closing remarks will deal with the article itself and its possibilities of legitimate medicinal use.

African copaiba, as found upon the market in the crude state, is a thick, strong-smelling liquid, containing over 10 per cent. of water and dirt. This water is very difficult to separate, as the specific gravity of the copaiba (0·9916 to 0·9996) combined with the viscosity of the liquid, prevents the settling out of much of the water, while the mixture is so thick that it will not in the cool state run through a filter.

We have successfully used the following method in our laboratory. A number of tin funnels of 1-gallon capacity were fitted into a large wooden box containing a series of steam pipes in such a manner that the stem of each funnel protruded from the bottom of the box. These funnels, with their filters, were filled with the copaiba, and steam at a low pressure (to avoid loss of volatile oil) was turned on, when the heated liquid was found to filter rapidly and effectively. To separate the water from the cleaned liquid, we made use of the following device: The mixture was placed in a jacketed kettle fitted with a tap in the bottom, and heated for some time at a temperature below the boiling-point of water. The heat, by rendering the copaiba more fluid, allowed the water to settle, and it was then tapped off from the bottom. The product so obtained was of a dark-brown color, with a reddish tinge, very fluorescent, and with an odor very different from the other copaibas. Upon standing for some time, it deposited crystals of what appear to be oxycopaivic acid. We have obtained, by distillation with steam, from 43·5 to

45·5 per cent. volatile oil. This oil has a yellow color, and in one sample, redistilled, we obtained a specific gravity at 15° C. of 0·928 and an optical rotation of + 5° 45′.

There seems little doubt but that this balsam is a product of a genuine copaiba, of which there are a number of species growing in Africa. Dr. E. H. Fenwick, F.R.C.S., has made therapeutic experiments with this material, and summarizes thus: "The oil possesses undoubted therapeutic power, all the patients, with one exception, acknowledging much benefit from its exhibition. I am told by patients that it is less nauseous to take, repeats less, but is less potent in its effects than the copaiba oil at present on the market (South American). I have used it in prostatic inflammation, fresh and chronic urethritis, stricture and pyelitis." (*Pharm. Journ. and Trans.*, 1893.)

With the evidence indicating that African copaiba is the product of a genuine copaiba closely related to the South American variety, and with clinical proof such as Dr. Fenwick offers, there seems to be little reason why this product, when sold properly under its own name, should not be granted a legitimate position in the treatment of those diseased conditions to which the other copaibas are applicable.

CORRESPONDENCE.

PHARMACEUTICAL DEGREES.

BALTIMORE, February 1, 1905.

To the Pharmaceutical Press of America:

I began the New Year owning the same peculiar devotion to pharmacy and its loyal votaries that has consistently possessed me during all the years that have passed since I first entered its "portals," and it is in this old-time, respectful, devoted and hopeful mood that I come with a plea to the Pharmaceutical Press; fully acknowledging its benign interest, splendid influence and unequalled power in all things pharmaceutic.

I come begging that this interest, this influence, this power may be actively directed towards the correction of a mistake, the removal of a hindrance, and, thereby, the advancement of a cause—no less a cause than pharmacy itself. I come earnestly begging the concentrated direction of all these potencies, because I am sadly convinced

that all will be needed; needed in their breadth, their strength and their fullness. Modesty and timidity made the mistake; over-ambition and unsympathetic assertiveness will try to perpetuate it.

For years and years, even from the very beginning, pharmacy as a whole and pharmacists as individuals have craved and sought recognition; not as scholars, from men of letters and their guilds; not as scientists, from men of science and their societies; not as philosophers, from men of philosophy and their associations; but simply as *professional* pharmacists, first from the laity, and then from those professions—medicine and dentistry—with which they have most to do. Strange as it may seem, the single thing that would have done most to have won recognition for pharmacy, as a profession—a *professional title*—"Doctor"—has been withheld; not the Doctor of Science, nor Doctor of Philosophy, nor yet Doctor of Medicine, or Doctor of Dental Surgery, but simply Doctor of Pharmacy, a science, profession, or what not, that has not risen and never can rise above the great mass of its votaries or beyond the demands upon its practitioners, no matter how much *individuals* among these may have honored the calling by the unusual advancement they may have made. Such a title or degree—Doctor of Pharmacy—as heretofore given, however much it may have cost in time, study or practical experience, has never meant more and never will mean more to any one, excepting those who conferred it, than that the bearer has been adjudged worthy, by some legally authorized school, to practise pharmacy, plain every-day pharmacy. If it means more than this, it will never get its true value from the overwhelming majority who are unitiated; *to them*, Pharmaceutic Chemist, Bachelor of Pharmacy, Master of Pharmacy, and, perhaps, even Graduate of Pharmacy, have a higher sound, a more exalted meaning.

The *higher* title or degree should mean more than does that which is so generally conferred upon us by the general public; conferred upon graduate and non-graduate; the ethical practitioner and the proprietor of nostrums alike. The public believes all should be qualified—believes all *are* qualified, and, thus believing, gives the title such qualifications it deserves, calling each—"Doctor." When none really own the title, who should defend it? When but a few, a very few, may honestly claim it, how will it be protected? Give it to all honest young men and young women who seek fitness to practise pharmacy through accepted channels, and who meet the

standards of the times, and they will valiantly defend it against usurpers and against its misapplication by the more careless and less intelligent public.

It is absolute folly to contend that the higher degrees from different schools have been, or ever will be, of equal value; in some, it is dependent upon so variable a measure as drug-store experience—the length of which is known but the quality uncertain; in another, the study and practice of advanced botany, volumetric estimations and assay; in still another, upon preliminary university counts. And thus will it ever be; always will be asked, "Whose superscription does it bear?" It is the lower degree that will become uniform. It will be standardized by the requirements of safety, through the examining boards, which, after all, offer the great stimulus and, as time goes on and they become more closely associated, the standards of both entrance and exit to colleges will be raised by them, while enthusiastic and erratic pioneers will continue to suffer.

If the ultra-scientific, ambitious scholar desires a higher degree, one beyond the regular requirements of his vocation, let him seek it as so many have done, with great credit to themselves, in the better established sciences and in philosophy. Let him secure something really distinctive, something that is standardized elsewhere, but let Pharmacy's degree or title be a thing to itself, meaning no more nor less than it should, and let it *gradually* grow in worthiness as the science of pharmacy has gradually grown, higher and higher, in spite of the hindrance; yet more slowly on account of it.

Gentlemen of the pharmaceutical press, lend all your influence and excite the influence of your readers that the noble army of coming pharmacists may be saved the embarrassment their elders have always suffered. Being properly addressed as *Doctors*, they will be stimulated to worthily wear the title and thereby honor the profession to which they belong.

In the interest of pharmacy and pharmacists of the future, I am,

With great respect for all concerned,

HENRY P. HYNSON.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

THE PROXIMATE CONSTITUENTS OF THE CHEMICAL ELEMENTS mechanically determined from their physical and chemical properties. By Gustavus Detlef Hinrichs, M.D., LL.D. With thirty-two plates. St. Louis, Mo., U. S.: Carl Gustavus Hinrichs, publisher. New York and Leipzig, Lemcke & Buechner; London, H. Grevel & Co.; Paris, H. Le Soudier. 1904. Price, $1.00.

This latest book by Professor Hinrichs was published last summer, and is dedicated to Prof. Dr. Clemens Alexander Winkler, who but recently passed away (see this JOURNAL, 1904, p. 532). This book contains an excellent photograph of Dr. Winkler, as well as photographs of a number of other eminent scientists who have encouraged and assisted the author in his work on "Atom-Mechanics" and the composition of the chemical elements during the years 1855 to 1904.

Professor Hinrichs defines a chemical element as "a substance which, thus far, has not been decomposed." He gives a graphic presentation of the characteristic properties of chemical elements, and divides them into genera or families. According to Dr. Hinrichs, the geometrical mathematical relation of the elements point to the conclusion that "all chemical elements are compounds of groups or links of one and the same material, united according to apparently very simple and very few modes of combination" (p. 24).

Dr. Hinrichs considers (p. 48) that from a fundamental substance or prime matter called by him *pantogen,* 114 elements or combinations have been formed, and that of these about two-thirds have been discovered. "Surely," he says, "the young chemist of to-day need not fear that the field of work is exhausted, and that there remains nothing for him to do."

The entire book is exceedingly interesting and very suggestive, but one needs to be familiar with graphic representations of numerical relations or geometrical reasoning in order to appreciate it fully.

A TEXT-BOOK OF MATERIA MEDICA, including laboratory exercises in the histologic and chemic examination of drugs for pharmaceutic and medical schools and for home study. By Robert A. Hatcher and Torald Sollmann. Illustrated. Philadelphia, New York, London: W. B. Saunders & Company, 1904. Price, $2.00, net.

This book is intended to be a laboratory manual on organic materia medica or pharmacognosy. The book is divided into three parts. Part I is devoted to the systematic study of crude drugs. In Part II, one hundred pages are devoted to the consideration of plant histology. Part III is given to "chemic exercises in materia medica."

Part I differs from the subject-matter in the usual books on materia medica in having at the beginning of each group of drugs an outline with blanks for the insertion of synonyms, important features in description, chief constituents, etc. The authors say in their preface that the laboratory method in materia medica "had never been tried." The reviewer might say, from his knowledge of the subject as taught in this country and abroad, that he is not aware that it is being taught in any other way at the present time. The treatment of plant histology in Part II resembles that in other books on this subject. The illustrations are chiefly from Godfrin and Noel's classical work, due credit being given to these authors. In the analytical key for the identification of an unknown powder, the main division is based on color, the sub-divisions following being based on taste of powder.

Part III is practically a chemical plant analysis. Some of the work outlined by the authors is usually carried out on the lecture table, and some in the chemical and pharmaceutical laboratories, where it probably more properly belongs. We believe that micro-chemical tests, or tests for quickly determining the quality of commercial varieties of crude and powdered drugs alone, should be included in the laboratory courses in ateria medica and pharmacognosy. If the chemical and pharmaceutical laboratories do not co-operate in this work, then it is important that provision be made for it in the laboratory course in materia medica or pharmacognosy. Leach, in his recent work on food inspection and analysis, shows the close relationship of analytical and biological studies, and Tschirch in the publications of his students shows the interdependence of pharmacognosy and plant chemistry. Dr. Hatcher and Professor Sollmann deserve credit for the careful work which they have done in the preparation of this book, containing as it does a large amount of useful information.

Food Inspection and Analysis. For the Use of Public Analysts, Health Officers, Sanitary Chemists, and Food Economists. By

Albert E. Leach, S.B., Analyst of the Massachusetts State Board of Health. Large 8vo, xiv + 787 pages, 120 figures, 40 full-page half-tones. New York: John Wiley & Sons; London: Chapman & Hall, Limited, 1904. $7.50.

With the vast amount of work which has been done in New England by public analysts it was probably to be expected that a first-rate book on this subject should come from an analyst of Boston. With the exception of the photo-micrographs, the work is extremely interesting and valuable.

The book is devoted to the consideration of the following subjects: food analysis and State control; the laboratory and its equipment; food, its function, proximate components and nutritive value; general analytical methods; the microscope in food analysis; milk and milk products; flesh foods; eggs; cereals and their products, legumes, vegetables and fruits; tea, coffee and cocoa; spices; edible oils and fats; sugar and saccharine products; alcoholic beverages; vinegar; artificial food colors; food preservatives; artificial sweeteners; canned and bottled vegetables, relishes and fruit products; an appendix on the Zeiss immersion refractometer, etc.

There are forty plates of photo-micrographs of pure and adulterated foods and adulterants. These include: cereals, legumes, miscellaneous starches, coffee, chicory, cocoa, tea, spices, spice adulterants and edible fats.

The author has considered the examination of food in a very broad way. Not only are chemical analytical methods considered, but he devotes considerable attention to the use of the microscope in food analysis. This portion is illustrated by the reproduced drawings of Moeller and a large number of photo-micrographs by the author. The excellent bibliography at the end of each chapter as well as the numerous references to literature enhance the value of the book considerably.

There is no one book that has ever been published that contains so much information on the subject of the nature, properties, composition and examination of food as this work by Leach. While it will be a reference book for the analyst, it is also valuable to the research worker; in fact, the entire book is an excellent contribution to research on foods.

THE VISIT OF HENRY S. WELLCOME.

Henry S. Wellcome, Ph.M., of Burroughs, Wellcome & Co., London, accompanied by Mrs. Wellcome and their little son, has been travelling in the United States, Canada and Mexico for some months past. They arrived in America in September last, went up the St. Lawrence River, journeyed by way of the Great Lakes to Duluth, visited the St. Louis Exposition, and continued their journey to the principal cities in the West, going as far as California. They then made an extended trip through Mexico, and, returning to the United States, visited the principal points in the Southern States, staying a fortnight in Washington as the guests of General John W. Foster, Ex-Secretary of State, and Mrs. Foster. They witnessed the inauguration ceremonies and were received by President Roosevelt. They came to Philadelphia on March 9th, remaining here until the 14th, after which they spent a few days at Lakewood, N. J., and ended their tour by a stay of several weeks in New York and vicinity, sailing for England the latter part of the month.

Mr. Wellcome is a graduate of the Philadelphia College of Pharmacy, and was tendered a most cordial reception while in Philadelphia. On the day of his arrival he and Mrs. Wellcome were given a dinner by Howard B. French, president of the College, and Mrs. French, at their residence, 2021 Spruce Street. On Friday Mr. Wellcome visited the College, accompanied by Mr. French and Mr. Aubrey H. Weightman, a grandson of the late William Weightman. They spent some three hours in going over the building, and Mr. Wellcome repeatedly expressed his pleasure at the improvements and progress which had been made since his graduation in 1874.

On Saturday afternoon, March 11th, at a special meeting of the officers and members of the College, including members of the Faculty and Board of Trustees, Mr. Wellcome presented to the College a massive gold-plated silver loving cup, on which was inscribed

To the Philadelphia College of Pharmacy, 1905,
From Henry S. Wellcome,
A Graduate of this College, 1874.

Mr. French presided, and in opening the meeting briefly alluded to Mr. Wellcome's brilliant career during the thirty odd years since his graduation.

In presenting the loving cup Mr. Wellcome said: "Mr. President and Members of the Faculty and College: My memories of the Philadelphia College of Pharmacy have always been sweet. I owe a great deal to this institution, and have never forgotten it. Many changes have taken place since I was a student at this grand old institution. Dillwyn Parrish was then president, and the Faculty included Professors Bridges, Maisch and Procter, Professor Remington being assistant to the latter at that time. It was a precious privilege, I assure you, to have such men as preceptors, and I am happy to see that the traditions of the old P.C.P. are being so nobly maintained. With the president of the College I went through the building yesterday, and as I saw the improvements which have been made my mind was carried back to the days when I was a student here and things were in a comparatively primitive state. I see in the splendid success and development of this College, the results of the untiring and well directed efforts of your president and your faculty. In appreciation of those old days I desire to present this loving cup as a small offering to that pleasant memory."

Mr. French said in response: "As president of the Philadelphia College of Pharmacy I accept this loving cup with great pleasure. It is always a delight to know that the graduates of our College remember and esteem their *Alma Mater.* This token of your appreciation will be a perpetual reminder of your kindness."

Remarks were then made by some of the others present. Professor Remington said: "I remember when I was also a student under the faculty which has elicited such warm expressions of regard from Mr. Wellcome. Little did they think that one of their students would be numbered among the great and distinguished men of our art and science. I have frequently referred our classes to these young men—Silas M. Burroughs (Class of 1877) and Henry S. Wellcome—as examples of the best type of Americans, being distinguished for ability, originality, pertinacity and adaptability. They went to London, the most conservative city in the world, and established a business which was successful from the start, and which takes rank as one of the boldest conceptions in commerce. This is certainly a most happy occasion, and I can only regret that those dear old professors whom Mr. Wellcome loved so much are not here to witness this occasion. Thirty years after graduation Mr.

Wellcome comes to his *Alma Mater* to acknowledge the debt he owed to the College and Faculty at that time."

Mr. Edwin M. Boring referred to the meeting of the American Pharmaceutical Association, held in Boston in 1875, and said that on his return he stopped in New York City to visit Mr. Wellcome, who was then associated with Caswell, Hazard & Co.

Professor Sadtler spoke of the exhibit made by Burroughs, Wellcome & Co., at the St. Louis Exposition, and said that it furnished a most striking display of the products of research, and was not excelled by that of any other exhibit. He also called attention to the Wellcome Chemical Research Laboratories in London and the excellent work which was being done under the direction of Dr. Frederick B. Power.

Professor Lowe referred to the Wellcome Research Laboratory at the Gordon Memorial College, Khartoum.

Mr. Wiegand moved that a vote of thanks be tendered Mr. Wellcome for his kindness and thoughtfulness in presenting the loving cup. This motion was unanimously adopted after being amended by Professor Remington to the effect that a committee be appointed to have the resolution suitably engrossed and sent to Mr. Wellcome.

In concluding the meeting Mr. French said: "A graduate who meets with such unusual success is a great credit to his *Alma Mater*. I may say that I would not exchange the education and training I received at this College for any sum of money."

Mr. Wellcome was entertained by a number of his friends in Philadelphia. He and Mrs. Wellcome were guests at luncheon at the home of Professor Remington on Saturday, and on Sunday they were the guests of the Rev. Dr. A. J. Rowland, Secretary of the American Baptist Publication Society, and Mrs. Rowland.

On Monday evening, March 13th, Mr. Wellcome was the guest of honor at a dinner at the Union League, which was arranged by the following committee: Mahlon N. Kline, James T. Shinn, Joseph P. Remington, Miers Busch and Howard B. French. Those present, besides the members of the committee, were: Mr. Harry B. Rosengarten, of Powers-Weightman-Rosengarten Company; Mr. Alba B. Johnson, of Baldwin Locomotive Works; Charles S. Pugh, Vice-President of the Pennsylvania Railroad; George F. Baer, President of the Philadelphia and Reading Railroad; Hon. W. W. Porter, E. T. Stotesbury, of Drexel & Co.; James W. Paul, Jr., of Drexel & Co.,

Hon. John Weaver, Mayor of Philadelphia, Dr. John H. Musser, President of the American Medical Association, and Prof. Samuel P. Sadtler.

THE CAREER OF MR. WELLCOME.

Mr. Wellcome has had a most interesting and varied experience. He was born in Wisconsin, and spent his early boyhood days in the midst of the Dakota Indian tribes in Minnesota, the scene of Longfellow's Hiawatha. Later he participated in the great Sioux Indian War, when more than a thousand whites were massacred.

Mr. Wellcome's apprenticeship in pharmacy was served under an English chemist, in Garden City, on the frontier in Minnesota. His uncle was a famous physician and surgeon whom he often assisted in operations at a very early age, and quite naturally he at first thought of studying medicine, but later decided to become a pharmaceutical chemist. He then went to Rochester, Minn., with Poole and Geisinger and here made the acquaintance of the distinguished surgeon, Dr. William Mayo, who took a great deal of interest in him, and encouraged him in his studies, and among other kindnesses loaned the young student his books. In 1871 Mr. Wellcome went to Chicago, just after the great fire, and entered the employ of Thomas Whitfield, whose store was then located at Eighteenth and State Streets. Here he met Dr. F. B. Power, with whom he formed a strong friendship, and Prof. F. M. Goodman, Dean of the Chicago College of Pharmacy, who was then manager of Mr. Whitfield's store. He entered the Chicago College of Pharmacy, where he attended lectures for one year, but as young Power had come to Philadelphia to assume the directorship of Parrish's Laboratory, he decided, at the suggestion of the latter, to finish his course at the Philadelphia College of Pharmacy. On coming to Philadelphia Mr. Wellcome took charge of Dr. Hershey's store, on North Fifth Street. He graduated in 1874, the subject of his thesis being "Urethral Suppositories." The mould devised by Mr. Wellcome for making these suppositories was exhibited at the Pharmaceutical Meeting on March 17, 1874.

Shortly after graduation Mr. Wellcome went to New York and took a position with Caswell, Hazard & Co., on Broadway. As showing the bent of his mind at this time, and his early appreciation of research work, we may refer to a paper by him on "Chlorinated

Alkalies as a Test for Morphia and Other Proximate Principles," which was published in this JOURNAL in 1874 (Vol. xlvi, p. 305). Other published investigations by Mr. Wellcome soon after were "Eriodyction," "the Damianas of the Market," "the Sources of Bromine," etc., etc. As showing still further his keen appreciation, even at this time, of the necessity for maintaining pharmacy on a high plane, we may refer to an article of his (AMER. JOUR. PHARM., Vol. xlvii, p. 15) on "Liquor Selling by Pharmacists," in which he asks for a remedy "by which the outside world can distinguish between the pharmaceutical saloon and the legitimate pharmacy." In 1876 Mr. Wellcome accepted a position with McKesson & Robbins, and in the interests of this firm went to South America, where he visited and studied the native cinchona forests which he described in a paper read before the American Pharmaceutical Association in 1879; also in an article published in the *Popular Science Monthly*. He conceived the idea that London would be an ideal place for a manufacturing chemist, and accordingly in 1880, in conjunction with the late Silas M. Burroughs, established the firm of Burroughs, Wellcome & Co., who have become noted all over the world as manufacturers of fine chemicals, alkaloids, pharmaceutical products, etc., etc. The keynote of this firm's success probably lies in their ready "recognition of scientific advancement and the adaptation of its results in their methods and work."

Mr. Wellcome's efforts have not, however, been confined entirely to the development of applied science as carried on in their manufacturing laboratories, but he has established two independent research laboratories in London, the one being devoted to chemical research under the direction of Dr. F. B. Power, and the other to physiological research under the direction of Dr. Walter Dowson. In addition, Mr. Wellcome has also founded and endowed Research Laboratories in connection with the Gordon Memorial College, Khartoum, Soudan, which was opened on November 8, 1902. These laboratories are for the study of tropical diseases of bacteriological and parasitical origin, of both plant and animal life and for general chemical and physiological research. The investigations are under the direction of Dr. Andrew Balfour, and the report of the first year's work has been recently published by the Soudan Government.

At the St. Louis International Exposition, 1904, the jury awarded a grand prize and three gold medals to the Wellcome Chemical

Research Laboratories for chemical and pharmacognostical research and for educational work, and a grand prize and a gold medal to the Wellcome Physiological Research Laboratories for bacteriological research and preparations, and for educational work, while three grand prizes and three gold medals were awarded to Burroughs, Wellcome & Co., for the scientific excellence of their products.

Along with the science of pharmacy Mr. Wellcome has also developed the art of pharmacy in a high degree, and in this he has been aided by his researches in the history of pharmacy and medicine, and the allied sciences.

Mr. Wellcome married the daughter of the distinguished London philanthropist, Dr. T. J. Barnardo; who has successfully rescued more than fifty thousand waifs from the miseries of the slums.

Mr. Wellcome is unpretentious and modest in demeanor, but genial and kindly, and this together with his magnanimity in promoting scientific research and his interests in public benefactions have won him a wide circle of friends, not only among scientific and business men, but also among those in other avocations.

PHARMACEUTICAL MEETING.

The regular Pharmaceutical Meeting of the Philadelphia College of Pharmacy was held on the evening of March 21st, Prof. Joseph P. Remington presiding. The meeting will probably go on record as one of the most important held in recent years tending to the uplifting and betterment of pharmacy. It will be recalled that at the January meeting the subject of the "Ethical Relations of Pharmacists and Physicians" was considered by Dr. Henry Beates, Jr., President of the Pennsylvania State Board of Medical Examiners; Prof. John H. Musser, President of the American Medical Association, and M. I. Wilbert, Ph.M., Apothecary to the German Hospital, Philadelphia, and the papers at the March meeting being on the subject of "Ethical Pharmaceutical Practice," followed as a sequence. This subject was considered by men actively engaged in the practice of retail pharmacy, and who were in every way qualified to treat its several phases.

Prof. Henry P. Hynson, of the Department of Pharmacy, University of Maryland, was the first speaker, and read a paper on

"Ethical Pharmaceutical Practice and its Recompense." (See page 153)

Dr. William C. Alpers, of New York, read a paper on "Professionalism *vs.* Commercialism in Pharmacy." (See page 162.)

George M. Beringer, Ph.M., read a paper on "The Evolution of Nostrum Vending and its Relation to the Practice of Medicine and Pharmacy." (See page 168.)

Professor Remington said that the Philadelphia College of Pharmacy was honored in having present such able representatives of the professions of medicine and pharmacy, and called upon Dr. Henry Beates, Jr., to open the discussion on the papers presented. Dr. Beates' remarks are given in another part of this JOURNAL. (See page 175.)

M. I. Wilbert, Ph.M., said, in commenting upon the papers presented, that Professor Hynson had shown that professional pharmacy is both a reality and an ideal; that Dr. Alpers, in his simile of the raft on the Niagara, had shown the course which pharmacy should take; and that Mr. Beringer's paper was important at this time in view of the action of the Council on Pharmacy and Chemistry of the American Medical Association, with regard to nostrums and proprietary remedies. (See page 179.) He then asked those present to read carefully the rules formulated by this Council in the spirit manifested at this meeting, and to assist the Council in carrying on the work.

Mr. E. M. Boring said that the question of right pharmaceutical practice was one depending upon personal character, and that we either do right of ourselves or are compelled by the law to do so.

Professor Lowe followed in a similar manner, and said that successful men are men of character. Mr. William McIntyre said that the young men present had an advantage in hearing such teachings as had been advanced this evening.

Prof. Joseph P. Remington announced, in the course of the meeting, that the prerequisite law had passed both houses of the Pennsylvania Legislature, and that there was a probability of Governor Pennypacker signing it, which has since been done. (See page 182.)

Prof. Harvey H. Mentzer commented upon the papers read, and also said that he was glad to hear that there was a strong probability of the prerequisite clause becoming a part of the pharmacy law.

HENRY KRAEMER, *Secretary.*

WILLIAM J. JENKS, PH.M.
1822–1904.

THE AMERICAN
JOURNAL OF PHARMACY

MAY, 1905.

WILLIAM J. JENKS, PH.M.

By George M. Beringer.

Among the sturdy pioneers and adherents to the doctrines of "religious freedom" and "the inward light," who accompanied William Penn in his emigration from England, was Thomas Jenks. He settled near Newtown, in Bucks County, Pa., his landed estate and the family home, which was built in 1732, being known as "Jenks Hall."

William J. Jenks was a direct lineal descendant of this Quaker pioneer, and was born on the 30th day of March, 1822, at "Pomona Farm," near Newtown, Pa. He was the oldest son of Michael Hutchinson Jenks and Mary Ridgway Earl Jenks. His father was a judge of the County Court, and in 1844 was elected a member of the United States Congress to represent the district of Bucks and Lehigh Counties.

His sister, Anna Earl Jenks, married Alexander Ramsey, the first Governor of Minnesota, and subsequently United States Senator and later Secretary of War under President Hayes.

The act to "Incorporate the Philadelphia College of Pharmacy" was approved March 30, 1822, and it is a remarkable and a strange, although a peculiarly fitting, coincidence that on the natal day of Wm. J. Jenks there was issued the charter of an institution with whose welfare he was to become so intimately associated, and in whose service he was to devote such a large portion of his life work.

In his youth he attended the district school of the Township of Middletown, and afterwards the academy at Newtown.

As a boy he was fond of such outdoor sports as fishing, skating, boating and hunting, which developed a good physique and a sturdy, healthy constitution, which sustained him to a ripe old age.

His scholastic education was finished at the institute of John Bullock, in Wilmington, Del. This select school was conducted by the father of the late Charles Bullock, and enjoyed an excellent reputation, and was well patronized by many of the prominent families of Friends of that day. Here he paid particular attention to the sciences, and to the study of the Latin language.

After leaving this school, in the fall of 1838, at the age of sixteen years, William J. Jenks came to Philadelphia, and at once entered the store of Smith & Hodgson, at the northeast corner of Sixth and Arch Streets, to learn the mystery and the art and science of the apothecary. This firm conducted both a retail and a wholesale drug business, and manufactured many of the pharmaceuticals and chemicals supplied to their customers. They also imported many rare drugs, some of which have since become obsolete, or nearly so. Mr. Jenks was wont to describe some of the old drawers and bottles that had accumulated in the "back store," so called, which was on Sixth Street, and contained such drugs as sagapenum, sarcocolla, bdellium, tacamahac, mummy and issue peas. Some of these had come down to them from their predecessor in business, John Biddle. This firm was composed of Daniel B. Smith and William Hodgson, Jr. Daniel B. Smith was well versed in chemistry and botany and the sciences generally, and was undoubtedly the most influential and best educated pharmacist in Philadelphia at that time. He was not only prominent in pharmaceutical circles as a writer and editor, but was greatly interested in the problems of education and social advancement of his day, and for a number of years he was a teacher at Haverford College.

William Hodgson, Jr., was an Englishman by birth, who had served his apprenticeship with the celebrated firm of John Bell & Co., of London. He is said to have been a very skilful and neat compounder and dispenser. This firm enjoyed the confidence of the leading physicians and the patronage of many of the best families of the city. This store had an established reputation, and the embryo pharmacist of that time was considered, indeed, fortunate to obtain employment therein and the knowledge and experience which the firm's business afforded.

William J. Jenks was happy in his association with these preceptors, and always spoke admiringly of their kindness and consideration for their employees. He endeavored to profit by the

opportunities afforded, and studiously and earnestly applied himself to the mastering of all details, and his thorough training in the business and duties of the pharmacist was ever afterward apparent to his friends and associates.

He attended his first course of lectures at the Philadelphia College of Pharmacy during the winter of 1839–1840, and the second in 1841–1842. The lectures in materia medica and botany were delivered by Dr. Joseph Carson, and those in chemistry, in the first course, by Dr. Franklin Bache, and in the second by Dr. William R. Fisher, who succeeded Dr. Bache who had resigned on account of his election as Professor of Chemistry in the Jefferson Medical College. In the year intervening between his attendance at college he selected a subject for his thesis and performed the experiments recorded in his inaugural essay on "Juniperus Virginiana," which was published in the AMERICAN JOURNAL OF PHARMACY, 1842, folio 230.

At that time the college occupied a property on Zane Street (now Filbert Street), east of Seventh Street, and the instruction consisted of lectures and such experiments as could be demonstrated on the lecture table. The students who were applicants for the degree and were coming up for examination at the end of the course, were requested to occupy the front seats, and the professor would devote about fifteen minutes before commencing his lecture in quizzing these on the instruction previously given. As there were no regular quizz masters the students were generally paired and quizzed each other.

William J. Jenks graduated in the spring of 1842. Among his classmates were Edward Parrish, who later became Professor of Pharmacy in the college, and Laurence Turnbull, who studied medicine and gained a reputation as a specialist in otology.

After graduating from the Philadelphia College of Pharmacy, Mr. Jenks continued with Smith & Hodgson as head clerk for about two years. It had been his intention to take up the study of medicine, but an intimate friend, Charles S. Ogden, desiring to engage in the wholesale drug business, a partnership under the firm name of Jenks & Ogden was formed in January, 1845, and the new firm located at 160 North Third Street.

Here a wholesale and retail drug business was successfully carried on for a number of years. The affability, genial disposition and

the recognized ability and character of Mr. Jenks gained many friends and customers. At the commencement of the Civil War, the firm met with financial embarrassment and Mr. Ogden then retired. A new partnership with Elwood Middleton was then formed, and the firm of Jenks & Middleton carried on the business for several years. After the dissolution of the latter firm, Mr. Jenks continued in the business at the same location until 1887, when, finding the jobbing business no longer satisfactory, he removed to 4043–4045 Market Street, and devoted himself exclusively to the retail drug trade, being actively engaged therein until incapacitated by his final illness.

William J. Jenks became a member of the Philadelphia College of Pharmacy in 1846, and the same year was elected as a trustee. He remained continually thereafter, for fifty-eight years, a member of the Board of Trustees. For a number of years he was secretary of the college, then second vice-president, and he was first vice-president at the time of his decease. On March 26, 1900, he was elected president of the college to succeed Charles Bullock. He immediately resigned, and in eloquent and appropriate language expressed his appreciation of the honor intended and the compliment paid by his fellow-members to his years of service, but he was firm in his conviction that the conditions now called for a younger man of energy and aggression, and his interest in the progress of the college, as well as his increasing years, admonished him against accepting the honor and duties of the office.

Shortly after his election as a trustee, Mr. Jenks was appointed a member of the Committee on Examination, and was soon made the chairman, which position he held until 1887. As chairman it became his duty to collect and arrange the committee questions and specimens. He took great pride in this work and was especially pleased in noting the increase in the number of students. "His boys," as he called them, were ever near to his heart.

It was in the work of this committee that he came in contact with the students and became endeared to them. His always pleasant, smiling, happy countenance during the examinations, proved an inspiration to many a student nervous over the finals, and restored confidence and natural ability. Many are to-day cherishing the memory of the "Grand Old Man" and his reassuring smile, who happened along with a pleasant word of encouragement just at the right time.

William J. Jenks knew personally the prominent pharmacists of Philadelphia, extending back over a period of more than half a century. His retentive memory stored away many remembrances of their peculiarities and the trade conditions existing during several generations. He greatly enjoyed relating some of the reminiscences of the days when the apothecary made many of his chemicals, powdered his drugs, spread his own plasters and priced his prescriptions in "fips" and "levies" ($6\frac{1}{4}$ and $12\frac{1}{2}$ cents) and exchanged shin plasters. The latter were small credit slips or notes issued by a number of city institutions and a few prominent business houses, and locally circulating as currency. When Boullay's process of displacement, subsequently named percolation, was introduced it met with much opposition from the druggists of Philadelphia, but Ambrose Smith championed the process and mastered it completely, and William Jenks was likewise interested in it and engaged in a number of experiments to perfect the process.

William J. Jenks was too modest to seek either political or social advancement, but his ability was too evident to be either overshadowed entirely by his diffidence or overlooked by his friends. He was elected a member of the School Board of the Tenth Ward in 1876, and a few years subsequently was selected as a member of the Thirteenth Ward School Board, and for several years served as secretary of this sectional board. He was a member of the Pennsylvania Historical Society, of the Friends' Historical Association of Philadelphia, of the Union League, the Numismatic and Antiquarian Society and the Bucks County Historical Society. For many years he was a director of the Philadelphia Drug Exchange, and was its president during the Centennial celebration in 1876. In 1887 his *Alma Mater* conferred upon him the honorary degree of Master in Pharmacy.

William J. Jenks was always of a happy, even cheerful, disposition, and his very presence was a pleasure of which his associates were sensible. Reserved, yet with an inspiring dignity, thoughtful and considerate of others' views and feelings, he enjoyed universal confidence and respect. His calm judgment, his conscientiousness, his sincerity, his friendly manner and his kindly mode of expression all bespoke the true character and the exemplification of the Christian gentleman.

William J. Jenks retained his physical strength and energy to a

remarkable degree to a ripe old age, and his memory and mental faculties remained unimpaired, as if he had discovered the secret of recurrent youth. He accomplished the difficult task of growing old most gracefully.

> "Though old, he still retained
> His manly sense and energy of mind.
> Virtuous and wise he was, but not severe;
> He still remembered he once was young:
> His easy presence checked no decent joy."

In September he contracted a cold which resulted in a severe attack of pleurisy and congestion of the lungs, and later became complicated with a weakness of heart action. In the course of several weeks he rallied from this severe illness, and again took a lively interest in current events, and his friends considered him as convalescent. On Friday, October 21, 1904, in the eighty-third year of his age, he succumbed to a sudden attack of heart failure, and so another devoted, noble character in pharmaceutical circles finished his earthly career. Another of the "old guard" of Philadelphia apothecaries that maintained the honor of their profession and added renown to the Philadelphia College of Pharmacy has responded to the Master's call.

The funeral services were held on Tuesday, October 25th, at his late home, 428 South Fortieth Street, Philadelphia, and interment was made at Woodlands Cemetery.

On October 7, 1851, William J. Jenks married Lydia A. Martin, daughter of Oliver Martin. They had six children, four of whom, one daughter and three sons, survive him.

ON A PTOMAINE EXTRACTED FROM THE PUTREFYING STOMACH AND STOMACH CONTENTS OF A DOG.

By F. A. Norton, B.S.

During the latter part of July, 1904, the stomach of a dog supposed to have died from strychnine poisoning was sent to this laboratory for examination. About one-third of the stomach and contents was immediately examined by a modification of the Dragendorff method for strychnine, which was demonstrated to be present by both chemical and physiological tests. At this time no

putrefactive products were encountered. The portion of the stomach and contents not used was returned to the container—a screw-top Mason jar—and the jar again sealed. No prosecution was made, and the stomach still being in the laboratory the following January, a re-examination was made to determine what, if any, decomposition products of toxicological interest might be present.

The Stas-Otto method as outlined by Vaughan and Novy in their work on Cellular Toxins was employed in this examination. Reagents were tested as to purity, and solvents purified when necessary. The stomach was in good condition, though the odor and presence of considerable gas indicated putrefaction. As the jar was tightly closed so that the gas was retained, the bacterial action must have been largely anaerobic.

Strychnine was again found to be present in considerable quantity in the chloroform extract, with traces in the ether extract. However, another body of a brown resinous character giving reactions for ptomaines was obtained in limited quantity in the acid and alkaline ether extracts, in the alkaline chloroform extract, and in large quantity in the alkaline amylic alcohol extract. Benzine alone of the solvents used, failed to remove any of the substance from alkaline solution. The amylic alcohol extract yielded about two or three grammes of residue. This I subjected to the usual chemical tests for strychnine with negative results, and then proceeded to the following examination of its properties.

The extract in color was a clear dark brown. While of a resinous consistence, it was rather soft, though not sufficiently fluid to flow. The taste was intensely bitter, but more acrid than strychnine. The odor, very strong and disagreeable, resembled that of certain beetles. The extract was readily soluble in water to a clear beautiful golden-yellow solution of slightly alkaline reaction. This solution on concentration yielded under the microscope, first, yellow oil-like globules, from which later needle-shaped crystals separated out to some extent. A drop of hydrochloric acid added to a portion of the aqueous solution seemed to render the odor and color less pronounced, and on concentration on a glass slide beautiful needle-shaped crystals readily formed, arranging themselves along radiate axes. The radiate arrangement was visible to the naked eye, but a low magnification was required to distinguish the individual crystals. This readiness to form salts, together with the

slight alkalinity of the body, would indicate that it was of a basic character.

In order to determine the constancy of the above characters, I dissolved a portion of the extract in distilled water, filtered to remove slight impurities, precipitated the body with mercuric chloride solution, filtered, diffused the precipitate in distilled water, precipitated the mercury with hydrogen sulphide, filtered, rendered the filtrate slightly alkaline with sodium carbonate and extracted with amylic alcohol as before. In this treatment the mercuric chloride filtrate was colorless, while the precipitate was a light yellow. On precipitating the mercury, the filtrate again assumed a clear yellow color, and on evaporating the amylic alcohol extract I could detect no material difference between the residue and the substance as first obtained. This would seem to show that the body was of quite definite character, as given above, and very free from impurities.

I then tried the physiological action of the extract on a good-sized frog, with very pronounced results. Ten milligrammes of the substance administered by the mouth produced a stupor in four or five minutes, from which the frog appeared to entirely recover in about two hours. Twenty milligrammes more was then given. Immediate stupor was produced, accompanied by slowing of the respiration and rate of the heart beat, congestion of blood in the extremities and finally death in about an hour. The frog was, at any time during this experiment, capable of reacting toward reflexes.

The reaction of the body to the following reagents employed in alkaloid tests was then determined. Unless otherwise stated, in each case a filtered aqueous solution of the amylic alcohol extract was employed for the test:

Phosphotungstic Acid.—Yellowish-white precipitate, amorphous, insoluble in excess, but soluble in ammonia.

Picric Acid.—No immediate precipitate, but on standing a slight yellow flocculent precipitate.

Tannic Acid.—An immediate dirty white flocculent precipitate.

Potassium Mercuric Iodide.—A turbidity was first produced, followed after a time by a light yellow flocculent precipitate.

Gold Chloride.—An immediate heavy brown precipitate was produced. The supernatant liquid, on standing a few minutes, became of a beautiful lavender color, and after a time a lavender amorphous precipitate settled out, leaving the liquid clear.

Platinum Chloride.—No immediate precipitate, but on standing some time a slight yellowish brown flocculent precipitate was produced.

Mercuric Chloride.—An immediate voluminous yellow precipitate.

Iodine in Potassium Iodide.—A slight brown flocculent precipitate.

Ferric Chloride and Potassium Ferricyanide.—Immediate bluish green color, followed by separation of an intense Berlin blue amorphous precipitate.

Potassium Bichromate in Concentrated Sulphuric Acid.—Brownish green color with odor of butyric acid. The solid extract gave a beautiful deep green color, resembling the test for morphine.

Frohde's Reagent.—A blue color was produced.

Chlorine Water.—A reddish color, disappearing on standing or on heating.

Sulphuric Acid.—No apparent reaction.

Nitric Acid.—Intensified yellow color, yellow residue on evaporation.

Hydrochloric Acid.—Apparent slight discharge of color; needle-shaped crystals were formed on concentration of the solution.

A further examination of the substance as to whether more than one ptomaine was present, and as to the ultimate composition of the body, together with other tests which might have been of interest, was prevented by exhaustion of the amylic alcohol residue. However, the presence, as a result of putrefactive action, of a basic body of alkaloidal character and marked physiological action is shown.

CHEMICAL LABORATORY, SOUTH DAKOTA
AGRICULTURAL COLLEGE AND EXPERIMENT STATION.

THE CULTIVATION OF SAFFRON IN LEBANON COUNTY, PENNSYLVANIA.

BY JOSEPH L. LEMBERGER, Lebanon, Pa.

CROCUS.—SAFFRON.

The stigmas of Crocus Sativus, U. S.

The dried stigmas and top of the style of Crocus Sativus, Br.; Safran, French, German; Zafferano, Ital.; Azafran, Sp.; Hebrew, כַּרְכֹּם (Karkôm); Gr., Κρόκος (Crocus), and Pennsylvania German, Saffrig.

In treating the subject referred to me, I am inclined to believe that some pre-history of this interesting drug will be acceptable—as I have failed anywhere to find a complete history of saffron; it is true that all of our dispensatories have given some attention, treating the subject as fully as required for the general reader and student. In an article quoted from the *Pharmaceutical Journal*, published in Vol. XIV, AMERICAN JOURNAL OF PHARMACY, 1848, which covers the subject fairly well and describes the cultivation of saffron in France and Austria, the kind of soil and physical condition best adapted; the diseases to which the corms are subject, the insects or parasites contributory to these conditions, and a partial remedy; the soils favorable, some of the adulterations found, and names the uses for which saffron is employed.

I may be permitted to quote the following from an ancient source of information, after giving the Persian, Greek and Hebrew names, and finding no difficulty tracing the name to the modern *crocus* or saffron. The writer states that all these names, Persian Karkom, Greek Krokos, Hebrew Karkôm, had the one common origin, saffron having from the earliest times been cultivated in Asiatic countries as it still is in Persia and Cashmere, and especially in ancient Cilicia. Crocus is mentioned by Hippocrates and Theophrastus. Dioscorides describes the different kinds of it, and Pliny says, "that the benches of the public theatres were strewn with saffron, indeed the ancients frequently made use of this flower in perfumes. Not only saloons, theatres and places which were to be filled with a pleasant fragrance were strewn with this substance, but all sorts of vinous tinctures retaining the scent were made of it, and this costly perfume was poured into small fountains. Even fruits and confitures placed before guests and the ornaments of the rooms were spread over with it." It was used for the same purposes as the modern "Pot-Pourri."

It is associated with fragrant substances in Holy Writ, a passage in Solomon's Song, chapter 4, verse 14.

Much might be quoted of most interesting information as indicating the high esteem in which saffron was held by the ancients, but I dare not depart any further from my subject as related to a modern period, and especially to our own time. During the past century a great deal of saffron was cultivated in my section of Pennsylvania—and no product of the garden was more profitable; it was

the one product that was, at least, worth its weight in silver, and to this day I do not purchase the home product in any other way. Saffron is placed on one scale pan and silver upon the other, and, as we say, what it draws, the seller receives. You may question this commercial singularity—it is that way or no way; unless the equivalent is proven to the satisfaction of the seller. In my county —Lebanon—the cultivation of saffron is declining; it is dying out with the generation of the Pennsylvania German housewives now passing, and as the care of the saffron bed is generally confined to the female head of the household for the reason that a portion of the garden (the woman's domain) is usually set apart for this purpose. The girls growing up to take their places, prefer attending crops not requiring the tedious care that saffron does; strawberries, and other small fruits having more attraction for them, which, while not quite as profitable, do not require the same amount of labor.

I took occasion to visit several homes where were found saffron beds, just at the season (late in October) while a few flowers were still to be found. I am, therefore, able to give the following facts: The soil is first well prepared (indeed the same preparation must be made as is needed for a garden), much attention is given to fertilizing with well-rotted barnyard manure, the soil thoroughly worked with spade and rake, and after this preparatory work the bulbs are planted as early in the spring as possible; the usual custom is to place 6 inches apart in drills, about 5 to 8 inches deep, 6 inches apart between the rows, and evenly covered. The bulbs rest through the summer thus planted, but the same bed is utilized for lettuce as a first crop, cucumber or any vegetable that will mature, so that the bed can be cleared by early fall. The saffron patch I saw, and have a note of, had produced a crop of early radishes, some lettuce and a large crop of cucumbers; without digging deep, the soil was again lightly worked and made mellow, as was done for spring planting, after removing the refuse vines and weeds; in a few weeks thereafter, about the time of the early autumn frosts in the latter part of September or October, the sombreness of the season is cheered by the growth of the crocus; when the flower and leaf appear almost simultaneously and as soon as the flower matures, the real labor commences. It is declared by growers that when the flower appears as soon as the foliage, the yield is most abundant; the flowers are plucked daily, early in the morning, and it is usually

made the evening work of mother, and other helpers, to separate the stigmas. The gathering of the flower covers eight or ten days, sometimes longer, depending largely upon weather conditions; much more tedious is the caring for the trifid stigma; there is an art in rightly plucking and separating it from the yellow style; some women are quite expert in this branch, as was demonstrated to me on my visit, and right here is where our commercial friends in the saffron countries abroad are not as careful as they might be. Cheap, ignorant labor is largely responsible for the quality of the saffron sold in the American market. With care saffron can be kept clean and clear of accidental, to say nothing of intentional, adulteration. It is very easy to adulterate saffron at least 25 per cent. before the flower is dropped in the operation of plucking the stigma, as any one familiar with the flower can appreciate. You have seen the dried corolla and other parts of the flower mixed in saffron. I have a specimen of commercial saffron which you will all pass as a good quality. It is in my judgment as good as usually found in the market. I also present for your inspection a portion of a specially selected article, bought several years ago, and saved to prove that pure unadulterated saffron may be produced.

It will be interesting for some of the readers to know what are the uses made of saffron by the housekeeper in our Pennsylvania German counties, and especially Lebanon, Lancaster and Berks and possibly sections of other counties. They have the ancient custom of employing the article in culinary dishes. A noodle soup, chicken and other stews are not considered up to standard if not flavored and colored with saffron; and when measles and kindred exanthematous diseases visit the household, saffron tea is the first remedy to promote eruption, and very frequently a handy remedy is found in its use as an emmenagogue. When the home demand is cared for and neighbors accommodated, the surplus may be sold to the druggist or country merchant.

WOULD THE CULTURE OF SAFFRON PAY?

The garden patch I saw and have associated with the following figures, will also be of interest: Its area was 12 x 14 feet, planted as indicated, and produced 1,500 to 2,000 flowers per season; this particular patch had the rows 15 inches apart. The estimate of flowers produced varied according to weather conditions, and was

based on the average of a number of years. The money value of this 1-259th of an acre was between \$9.00 and \$10.00. A simple sum in arithmetic will prove the value of saffron culture if systematically conducted with a view of making it an agricultural industry.

Custom and superstition go hand in hand with saffron culture in Pennsylvania. It is also interesting to learn that the foremothers of the present growers of the saffron realized the necessity for some remedy to counteract the diseases the bulbs were liable to. As a matter of fact, the two principal diseases are the dry-rot and the other the death; the French name it *la mort*, caused by parasites or insects; tradition has taught our people to plant garlic (*Allium sativum*) and allow it to occupy intervals between the rows for a part of the season. The mole or ground-rat sometimes assails the saffron bed also, and to meet this enemy the same teacher has arranged that they must bury a quarter of a loaf of bread in the saffron patch. About the time of picking saffron, when driving through the country, you will readily observe where attention is given to saffron culture. It is the invariable rule to throw the useless flowers, after separating the stigmas, into the highway. I had a curiosity to know why this was so generally done. The answer was, "the old people always did so, and we carry on the custom." When further pressed for a reason, I was told it was done to perpetuate good luck. To insure future crops, the flowers must be scattered, not burned nor thrown upon the dunghill to rot.

SUBSTITUTION OF AMERICAN CENTAURY.

By Rodney H. True.

At the request of a prominent Eastern drug house, a number of samples of American centaury have been examined in the laboratory of Drug Plant Investigations of the Bureau of Plant Industry, the differing appearance of herbs going by this name having aroused a suspicion that a partial substitution had taken place. Samples of the types involved were submitted to Dr. J. N. Rose of the National Herbarium, who found that in large part the material represented consisted of *Rhexia mariana*, commonly known as deer grass or meadow beauty, the remainder being the true article, *Sabbatia angularis*. Samples from five other sources gave, from a total number of

eight samples seen, three of the spurious article and five of the genuine.

Sabbatia angularis (L.), Pursh,[1] a member of the gentian family, is found in rich soil from New York and Pennsylvania to Ontario and Michigan and southward to Florida, Indian Territory and Louisiana. It reaches a height of from 2 to 3 feet, flowering in July and August, the bloom being rose-pink in color with a central greenish star.

Rhexia mariana L.,[2] a member of the *Melastomaceæ*, grows in sandy swamps from Long Island and New Jersey to Florida, Illinois, Missouri and Texas. It reaches a height of from 1 to 2 feet, flowering from June to September and bearing pale purplish flowers.

It will be seen that the plants have some striking points in common. They occupy the same territory over a wide area; the time of flowering overlaps; the stature is not distinctive, and the general coloring of the flowers is somewhat similar. In *Sabbatia angularis* the stem is square and narrowly winged; in *Rhexia mariana* it is round, but in the nearly related species, *R. virginica* L., which seemed to constitute the bulk of one sample, the stem is square. Hence, it would not be altogether surprising if ignorant collectors had to some degree confused the plants concerned.

It is, however, not dificult to distinguish the spurious article from the genuine. The following points of difference are readily detected in the dry herb, and may be observed in the chopped articles:

(1) *Sabbatia* herb has a strong, clean, bitter taste, which is quickly noticed on chewing. *Rhexia* herb is not bitter, but lacks a distinctive taste of any kind. This is a quick and convenient way of distinguishing them in the warehouse.

(2) In *Sabbatia*, portions of the flowers, turned reddish-yellow in drying, are to be seen and the oblong seed vessels enclosed about the base by the remnants of the calyx containing a large number of small seeds. In *Rhexia*, the seed vessel enclosed by the remnant of the calyx consists of a rounded basal portion passing upward into a narrower neck-like part which is expanded again into a flaring portion, on the margins of which are situated the remnants of the calyx

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[1] "Britton's Manual of the Flora of the Northern States and Canada," p. 730, 1901.

[2] Ibid, p. 651.

lobes. This flask-shaped structure is somewhat ribbed, and is sparingly beset by bristly hairs. As seen in the samples inspected, the *Rhexia* seems to be a more stemmy article than the *Sabbatia.*

U. S. DEPARTMENT OF AGRICULTURE,
December 31, 1904.

ON THE PAST, PRESENT AND FUTURE OF PHARMACEUTICAL DEGREES IN AMERICA.

BY M. I. WILBERT,
Apothecary at the German Hospital, Philadelphia.

At no period during the thirty or more years that the question has been actively under discussion has the subject of pharmaceutical titles attracted, or received, greater attention than is being given it at the present time.

The direct cause for this unusual interest is no doubt to be found in the greater attention that is being devoted to the subject of pharmaceutical education, its shortcomings and its ultimate possibilities, and also to a more thorough understanding of the very great differences that exist, in the entrance requirements that are asked, the instruction that is given and the degrees that are conferred by the various pharmaceutical schools now existing.

Appreciating the fact that the history of any given subject may have an important bearing on the probable solution of questions arising in connection with the same, and believing, furthermore, that the history of the origin and uses of pharmaceutical titles in America might have a peculiar and timely interest for all concerned this contribution is offered with the hope that it may prove interesting, and that the ideas and opinions of some of the earlier leaders of our profession may serve to indicate a rational and generally acceptable solution of the present controversy.

Dr. John Morgan, who is properly recognized as the originator of pharmacy in this country, returned to Philadelphia in 1765, where he was the first to institute the European practice of writing prescriptions and of having them compounded by competent apothecaries. This practice, even in Philadelphia, spread slowly, and it was more than fifty years later, in 1816, before any attempt was made to teach pharmacy by means of a regular course of lectures. Five years later, on February 21, 1821, the Board of Trustees of

the University of Pennsylvania, acting on a recommendation from the Professors of the Medical Faculty, adopted a resolution instituting the degree of Master of Pharmacy, to be conferred by the Board of Trustees on such persons exercising, or intending to exercise, the profession of an apothecary as are or shall be duly qualified to receive the same. Provisions were also made for instituting a course of lectures on chemistry, materia medica and pharmacy in the University, and all future candidates for the degree, in addition to serving three years' apprenticeship with a respectable apothecary or a master of pharmacy, were to be required to attend at least two courses of lectures in the new school.

At the ensuing medical commencement in April, 1821, sixteen gentlemen, apothecaries, the majority of them resident in the then city of Philadelphia, received the degree of Master of Pharmacy.

This attempt on the part of the Trustees of the University to improve and to elevate the practice of pharmacy aroused the enterprising spirit of the druggists and apothecaries of Philadelphia and led them to found a college of their own, "for the two-fold purpose of providing a system of instruction in pharmacy, and subjecting themselves to regulations in their business."

One of the most frequently quoted objections to the proposed course on pharmacy in the University was the fact that the trustees and professors proposed to bestow distinguishing titles on the graduates. So deeply was this objection to distinctive titles rooted in the minds of the founders of the new school of pharmacy that they positively refused to include testimonials, degrees or awards in the provisions of their school. It was not until some years after Dr. George B. Wood had been elected to fill the chair of chemistry in the college that any concerted attempt was made to introduce some form of distinction or award to such of the students as had completed the prescribed course and had undergone a satisfactory examination.

So far as known, this subject was first brought to the attention of the College in an address to the members of the Philadelphia College of Pharmacy, by Dr. George B. Wood, delivered November 16 1824. In the course of this address, while speaking of the requirements of the institution, Dr. Wood said: "In all great seminaries of learning and science it is a practice sanctioned by the experience of centuries to reward by some public testimonial of approbation

those students whose industrious application and correct deportment have given satisfaction to their instructors. The hope of distinction is perhaps the strongest passion of the youthful mind; and even that honor, which an ordinary degree in the arts confers, is sought after with an ardor and perseverance which they who have forgotten the feelings of their earlier years can seldom fully appreciate.

"The power of conferring degrees, attached to all collegiate institutions, may be considered almost an essential part of their constitution, and the practice is certainly essential, as a general rule, to their successful operation. The school of pharmacy cannot be regarded as an exception. I do not think I am going too far when I say that it will never flourish until this practice is adopted.

"To the young apothecary, a degree from the college would be desirable, not only as an honor, but also as an effective instrument for the promotion of his success in business. When the public are generally informed, as they some time undoubtedly will be, of the nature and designs of the institution, it cannot but happen that a preference will be shown for those to whose knowledge and skill its testimonial can be advanced; and at some future period a degree in pharmacy may be as indispensable to the apothecary as that in medicine now is to the physician. In order, however, that the degree may have the greatest possible weight in the opinions of men it should never be conferred on the student till he have passed through a certain course of study and practice united, and, by an examination before competent judges, shall have shown himself worthy of the honor. It should, moreover, be confined to those whose moral character is unexceptionable." The suggestions made in this address were acted on but slowly. It was more than a year later, on January 31, 1826, before the members of the College, recognizing the necessity of such a move, finally adopted a resolution that in future all students who had completed the attendance on two courses of lectures, had passed a satisfactory examination in the branches taught and were able to furnish satisfactory evidence that they had been engaged in the business of an apothecary, were to be adjudged "Graduates in the Philadelphia College of Pharmacy." Is was fully half a century later, however, before the use of such a certificate of proficiency, to generally promote the business of a pharmacist, was considered legitimate, and we of

to-day, more than eighty years after the address was delivered, are only now beginning to appreciate the necessity of some such evidence of systematic instruction in the sciences relating to pharmacy before an applicant be admitted to the practice of our profession.

It was on August 23, 1826, that the then president, Mr. Daniel B. Smith, conferred the degree of Graduate in Pharmacy, or "Graduate in the Philadelphia College of Pharmacy," on the first successful candidates, comprised of a class of three young men.

On this occasion the president delivered an interesting, and now extremely valuable address, dealing largely with the conditions as they then existed, and outlining to some extent the objects of the College and its ambitions for future improvements. As much of the material contained in this address has a direct bearing on the subject under discussion, it may be well to quote from it quite extensively. In speaking of the objects of the College Mr. Smith said: "The mark at which we are aiming is, however, much above the standard of any present attainments. Before we can assume to compete with the kindred institutions of the Old World our system of scientific instruction must be extended to other branches of natural history and rendered more thorough and minute in those which are already taught."

"Our diploma is, of course, but an honorary distinction, that confers no privileges or advantages beyond those which public opinion accords to the well instructed and intelligent. It bestows no title, for it was the design of the college to avoid any name which may hereafter acquire a peculiar meaning, and become the designation of a new class analogous to the English apothecary. In attempting to avoid this danger, it has committed what may perhaps be esteemed a blunder by establishing a distinction without giving to it a specific name, and simply declaring that the successful candidate is a graduate in the college."

The example set by the Philadelphia College of Pharmacy was closely followed by the other schools as founded, and it was not until about 1873 that any concerted attempt was made to confer what might be termed a collegiate degree for a course in pharmacy.

In the early seventies no less than three, then newly founded, schools of pharmacy began to confer the title Phar. D. on their graduates. As was to be expected, this rather startling innovation

met with considerable opposition from the officers and representatives of the older and more conservative colleges of pharmacy. The meetings of the American Pharmaceutical Association, and the accompanying conferences of the representatives of teaching colleges of pharmacy were frequently burdened with lengthy and at times caustic discussions relating to this, at that time, unpopular innovation.

In this connection it may be of interest to refer to the discussion on the admission of the delegate from the Georgetown College of Pharmacy, in the Proceedings of the American Pharmaceutical Association for 1872, the report of the meetings of the representatives of teaching colleges of pharmacy in 1874, the report of the special committee appointed by the Philadelphia College of Pharmacy in 1874, to inquire into the subject of granting the title of Doctor in Pharmacy, published in the AMERICAN JOURNAL OF PHARMACY, and the discussion on reputed irregularities in granting the title of Doctor in Pharmacy, with report of special committee to inquire into and report on the facts in the case, published in the Proceedings of the American Pharmaceutical Association for 1875 and 1876.

How deeply the leading pharmacists of that period felt on the subject of pharmaceutical titles is evidenced by the opinions expressed by Prof. Wm. Procter, Jr., in one of his last editorials in which, in answer to an inquiry on the subject, he said: "The value set upon titles varies much with individuals; so much so, indeed, that many will work more earnestly for a title than for more important things. If their possession carried with it the knowledge and dignity which sometimes it is presumed to represent, then titles might well be sought for as desirable evidence of accomplished work.

"Pharmacy is to a large extent an art which every well-qualified apothecary masters. Its pursuit involves so much scientific knowledge that it may very properly be called a profession, and he who properly practises the art is a master in pharmacy."

Professor Procter further suggested that the young men be moderate in their desire for titles, and that they be satisfied with Graduate or Bachelor of Pharmacy, and that they, after a due probationary period, aspire to the more elevated and more dignified degree of Master of Pharmacy.

The title of Doctor of Pharmacy, as a purely honorary distinction, was first conferred by the Maryland College of Pharmacy some time

before 1870. Prof. Edward Parrish, in referring to this distinction in 1871, said: "A degree of Doctor of Pharmacy seems appropriate to place our profession on a par with those of medicine and of dentistry.

"This has already been granted to a few distinguished pharmacists by the Maryland College of Pharmacy, but would seem well suited to designate all graduates in pharmacy who have devoted themselves creditably to the legitimate practice of their profession for a term of years. A title of this kind would hardly seem pretentious if held in reserve by the college until their graduates had attained a well-recognized professional standing and the prospect of attaining it would be an honorable incentive to professional effort."

The special committee appointed by the Board of Trustees of the Philadelphia College of Pharmacy in 1874 to consider the subject of conferring the degree of Doctor of Pharmacy on the graduates of the College, in their report, deprecated the adoption of the proposed title, and enumerated, among other reasons, the fact that pharmacy and the practice of medicine being so closely connected, the title would tend to confusion. The committee recommended that the College adhere to the time-honored practice of conferring the title of Graduate in Pharmacy, but also recommended the conferring of an additional degree, not designated, on graduates of the College who, by pursuing some original investigations, had demonstrated their fitness for the same. This latter recommendation was acted on the following year, when the degree of Master in Pharmacy, in course, was provided for. Eleven years later, on May 4, 1886, the degree of Master in Pharmacy "Honoris Causa" was instituted, and in the following year, February 1, 1887, the Philadelphia College of Pharmacy conferred its first honorary degree.

Recurring now for a few moments to the now generally accepted propriety of exhibiting the evidence of having attended a college of pharmacy, it may be interesting to note that as late as 1874 this practice was deprecated by a writer in, and also the editor of, the Chicago *Pharmacist,* one of the predecessors of the *Western Druggist.*

Prof. John M. Maisch, the editor of the American Journal of Pharmacy, contended, in opposition, that the number of graduates from colleges of pharmacy had increased to such an extent and the opportunities for attending schools of this kind had become so numerous that there was little or no reason why graduates from

pharmaceutical schools should not display the evidence of their superior interest in their calling.

Of the present status of Pharmaceutical Degrees little need be said in addition to what has already been pointed out by Prof. J. T. McGill in his paper on "What Degrees should be conferred by Schools of Pharmacy," read before the section on Education and Legislation of the American Pharmaceutical Association, at Kansas City, in 1904.

Of the origin of the several titles it may be said that Graduate in Pharmacy was undoubtedly suggested by the title "Pharmacien" conferred by the French schools of pharmacy. This will appear all the more probable when we remember the close relations that existed between the founders of the Philadelphia College of Pharmacy and the products and writings of the French pharmacists of their time. The title Pharmaceutical Chemist is generally used in England and is awarded by the Pharmaceutical Society on all that successfully pass the major examinations. Master of Pharmacy has been used for many years in several of the larger countries of Europe, particularly in Russia and in Austria, and its more recent use in this country was probably suggested by the communications of Professor Dragendorff on the subject of pharmaceutical titles. The titles Bachelor and Doctor are generally considered to be of academic origin, and for academic use, and for this reason there has been much and varied opposition to their use in purely technical schools.

The rather promiscuous use of the title Doctor, by colleges of pharmacy, is particularly to be deplored, and despite what Professor Remington, and more recently, Professor Hynson, have had to say in favor of conferring the degree of Doctor on graduates of colleges of pharmacy, there appears to be a peculiar unfitness about this particular title that makes its use for graduates in pharmacy especially undesirable.

The objectionable features connected with the title Phar. D. are more particularly evidenced if we review the dictionary definitions for the use of the word Doctor. Lexicographers tell us that a doctor is a teacher, an instructor, a learned man, a person endowed by a university with a diploma certifying to his proficiency in the sciences or recognizing his position as a teacher. The evident derivation of the word, in this connection at least, is such that it can hardly be made applicable to the acquirements and practices of the retail pharmacist.

There are, it is true, other definitions for the word. The same lexicographers tell us that a doctor is a person duly licensed to practise medicine or surgery, or a person duly qualified and experienced in the treatment of diseases. Under this somewhat popularized definition we may very properly include the M.D. or doctor of medicine; the D.D.S., vulgarly speaking, the tooth doctor; and the D.V.S. or horse doctor, for the definition does not confine or limit the definition of diseases to diseases of human beings. The P.D., on the other hand, would necessarily be restricted under this definition to the treatment of drugs, and under this interpretation we might possibly apply the corresponding definition of the verb to doctor; that is, to disguise by mixture or manipulation, to alter for the purpose of deception, to cook up, to tamper with, to adulterate.

Surely no one having the interests of pharmacy at heart can or will countenance such an interpretation of the objects of our vocation. If pharmacy is to be our occupation, and if the occupation has been and is a legitimate and honorable one, why should we object to being called pharmacists, and why should we attempt to appropriate titles that are not in harmony with the requirements and objects of our occupation? Despite the fact that the title Phar. D. has been conferred in this country for upwards of thirty years on the graduating classes in colleges of pharmacy, and during that time has probably been conferred on thousands of graduates, it certainly has signally failed to be recognized or appreciated by the mass of people who have come in contact with, or have required the services of, these men.

The title Pharmacist, on the other hand, has become recognized as a proper and honorable one. The occupation of the pharmacist, as an occupation, is much more in keeping with that of the chemist, having bred and fostered the latter, it would be quite appropriate, therefore, to adopt or to continue the use of pharmaceutical chemist, providing we were not quite content with the now time-honored Graduate in Pharmacy. In this connection we should always remember that we cannot expect to raise our own individual standing, or the standing of those dependent on us, by attempting to bring the conditions of our surroundings down to our particular level; we must, on the other hand, attempt by all the means at our command, to raise ourselves and others in our particular line, up to oreven above the standards of requirement for the classes with

which we wish to come in competition or with whom we wish to associate.

The question then naturally arises: What of the future? are we to be content with present educational requirements, and are our successors in the same field to be satisfied with the degree of Ph.G., or Ph.C.? Certainly not. The future American pharmacist will be, must be, a truly educated and highly scientific man. With the ever increasing demands for specialization there will be a corresponding demand for more specialized education along chemical and pharmaceutical lines; fully in harmony with that given in all other lines requiring specialized instruction or education. With this tendency to specialization there is a corresponding tendency towards concentration, particularly along educational lines. This tendency having once been fully appreciated, it will rapidly develop, and the time will not be far distant when by a proper selection of scientific courses at any of our larger universities the B.A., or perhaps only the M.A., may gain for himself an honorable and fitting title and sufficient technical knowledge to properly conduct a dispensing pharmacy and, in addition, make such contributions to the advancement of his own particular branch or branches of science as will enable him to do honor to the degree of Doctor of Philosophy, that he may rightfully claim to be his.

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THE IMPORTANCE OF INSURANCE TO PHARMACISTS.

By J. B. Moore.

FIRE INSURANCE.

Every pharmacist, business man and, in fact, every person possessing property of any value, should have it insured in some good and reliable company. If he is not able to take a policy for the whole amount of the property he should have it insured for such part as he can afford to carry. This should be done not only in compliance

with the dictates of common sense, prudence and good business judgment as a protection against loss by fire, which may occur at any time and usually when least expected, but also for the peace of mind and sense of security which it affords.

When you are properly insured you will not be greatly excited every time you see a chimney on fire or smoke issuing from the doors and windows of a neighboring house when they are making their morning fire, or when you hear the sound of the bells of a fire engine passing in the immediate vicinity.

Many persons are often deterred from taking out fire insurance because they imagine they are so careful and watchful in the management of their fires that the occurrence of a destructive fire upon their premises is next to an impossibility. Hence, they repose in confidence, inspired by a false sense of security, and apparently unmindful of the fact that neighbors, their servants and employees may not all be such careful and prudent folks as themselves.

When I first started in business I was, like many other young men, rather careless and indifferent about fire insurance. In those days, however, insurance was not so popular and people did not pay the same attention to it as they do nowadays, so I conducted my business for a number of years without any insurance, either upon the stock and fixtures of my store or upon my household goods, an omission which I now consider an important mistake of my life; fortunately, however, no evil results followed. I was influenced in the matter by just such erroneous and misleading notions as I have mentioned above, although on one or two occasions I came very near having a fire in my cellar which, if it had not been extinguished in time, might have stripped me of all my earthly possessions.

Notwithstanding this timely warning, I still neglected from day to day my insurance, until one cold and blustery morning I noticed smoke issuing in dense volumes from a neighbor's chimney only a short distance away, and the wind blowing quite a gale in the direction of my store. I became alarmed, naturally, until I ascertained that it was simply the chimney that was on fire. I hastened at once to the office of a reliable insurance company and secured a suitable policy which covered my household goods as well as my stock and fixtures, which insurance I maintained ever afterwards.

An ambitious and industrious young man may commence and by close attention build up quite a prosperous business—a fire occurs

and destroys everything he has and, as he is *not* insured, what is to become of him? He has lost all and is without reserve capital to fall back upon to refit and restock another store. The very building which he occupied has been destroyed and he is left neither business, money, nor perhaps home with maybe a wife and small children to take care of and provide for. Under these distressing circumstances he may not have a kind and generous friend to appeal to for aid, for friends at a time like this are generally very scarce.

The friend who would have been willing to have loaned you in the days of your prosperity a thousand dollars, when you didn't need it, would not now loan you a dollar. He would probably not even as much as give his sympathy, for he would more than likely say, "Served you right. Why didn't you have your property insured as any sensible and good business man would have done; for the sake of a few paltry dollars you neglected to perform one of the most important business duties of your life, which was to have your stock and fixtures and your household goods insured as soon as they were *put in place*."

In taking out your insurance policy do not make the mistake that many persons do of greatly overestimating the actual value of your property, but rather take the exact cost with an allowance for such increase of stock as you would reasonably expect from the growth of the business during the year or period for which you are insured. You may have a stock which at a liberal valuation is worth $3,000, and you have it insured for $5,000 or $6,000, thus encumbering yourself with a premium nearly double, which you will have to pay every year and from the half of which you will never derive any benefit in case of loss by fire, because all first-class and reliable insurance companies ignore all claims for imaginary losses.

Insurance companies and their adjusters thoroughly understand their business and are very quick to detect any attempt at deception or fraud; and the fact of a person having his property insured greatly above its value at once excites the distrust and suspicion of the company and its adjusters as savoring of an attempt to defraud, which may militate against your securing a generous or even a fair adjustment of your loss.

If you show the least disposition to take any undue advantage of the company they will be likely to fight you at every step of the adjudication. All of your statements of claims for damages have

to be made under oath, so that any attempt to sustain an unfair claim will make it very unpleasant and embarrassing, if not humiliating, for you. Hence I would advise you to take the warning and keep out of all such embarrassing predicaments.

In life insurance a man can value his life at any amount he chooses, and the company issuing the policy is obliged to pay the claim in full unless it can be proven that the insured had resorted to misrepresentation and fraud to secure the policy. But not so in fire insurance. The claim for loss has to be sustained by actual proof of the amount of damage.

This wise and conservative rule of fire insurance companies in discriminating against and positively refusing to pay all exaggerated losses claimed upon excessive insurance policies, prevents many conflagrations. If they made no resistance and paid all such losses it would offer a premium to incendiarism, and neither our lives nor our property would be safe at any time.

There are thousands of dishonest and heartless people who would have their stock of goods, furniture and other property insured for excessive amounts, and then deliberately apply the torch for the purpose of securing the large amount of insurance, regardless of consequences, endangering the safety of the lives and property of a whole neighborhood, for when a fire is once started, and especially at a time of high winds, no one can foretell where it may end, or what loss of property and life it may entail.

So we must all concede that this prudence and conservatism on the part of insurance companies is just and commendable and not for their own interest alone, but for the protection, safety and welfare of the insured.

Many persons think that insurance companies are often unfair and unjust in their adjudication of losses, but I believe that in most cases of this kind it is due to there being a condition of confusion in the facts or circumstances of the case which interferes with a clear and accurate estimate of the loss. For instance, a person may not have had an inventory of his stock taken, or not for a number of years, and there really may be no correct or reliable data to guide him in estimating the loss, and so may have entertained a very exalted and erroneous idea of his loss. In all such cases doubt and dissatisfaction are sure to result. From what I have learned from many persons who have been so unfortunate to have had losses by

fire, I am led to believe that the insurance companies treated them generously. In fact, their success and popularity, even their very existence, depend upon their justice and fair dealing toward the insured. But we are all apt to think we don't get enough.

Thus it will be readily seen by any intelligent and reasonable person of what momentous importance fire insurance is to us all. And it is not so much to the rich property holders that fire insurance appeals with the greatest force, but to the man of limited means who has only his stock and fixtures, with perhaps the property he occupies. If he should lose it by fire it would deprive him of the means of making a livelihood and leave him in dire distress. Yet it is unfortunately just this class of our citizens who, on account of their scarcity of means and consequent inability to pay the premium on an insurance policy, are the most likely to neglect to protect themselves by fire insurance.

Whereas, if a man of wealth should lose a whole block of houses by a disastrous conflagration, and not be insured, and he still has another block in his possession, he of course will feel the loss very seriously and it will be the source of much grief and regret to him, which, however, he will soon forget and he may find much consolation in the thought that it might have been still more serious.

The best and wisest business man will sometimes neglect and postpone the performance of an important act which may be followed by the most disastrous consequences, but he takes chances, hoping for the best. Many of us are afflicted with this weakness of procrastination, unmindful of the old adage—"What is to be done to-morrow should be done to day." When, under such circumstances, misfortune befalls us, we have no sympathizers. Everybody is ready to say "it served him right," not having charity enough to think that under similar circumstances they might have been guilty of the same omission.

Fire insurance should never be deferred or neglected.

LIFE INSURANCE.

I will now offer a few hints in regard to the importance of life insurance. Although the latter is not of such imperative necessity at the incipiency of his business career as the former, yet if he has a wife and children it should receive his attention at the earliest possible time that he is able to take out a policy, which, if small, he

should increase at every available opportunity. If he has a poor widowed mother or invalid sister he should, as soon as he is able, make some provision in the form of a life insurance policy for their support after he is gone, so that they will not be left in poverty and distress.

This, of course, is not obligatory, but the natural promptings of humanity and a good kind heart should make it so. The provision for your immediate family, however, should be secured at the earliest possible moment, for you know not when the fatal hour may come, and because the premium in life insurance up to 30 or 35 years of age is small. Therefore, if you are doing only a moderately fair business you can take out a policy for a few thousand dollars and you will hardly feel the payment of premiums, as you can have them made payable quarterly, half-yearly or annually. While your means are limited I would advise you to take out a policy on the life plan, as in this form your premium will be lighter. Endowment policies are much more expensive, but one of these can be taken out later when it won't draw so hard upon your exchequer.

There is hardly anything in which you can invest your money that will be more secure or that will pay you a better interest than life insurance. Besides, you will experience much peace of mind and comfort in knowing that in case of your untimely death your wife and family are provided for, although you may not have an additional dollar in savings to leave them.

After you have liberally provided yourself with life insurance you can enjoy life better and be happier, and you and your family can indulge a little more freely in life's pleasures. Whereas, if you are not insured you may have to exercise the most rigorous and even painful economy, and often be obliged to deprive yourselves of necessities at the table and in dress, and also many little pleasures and enjoyments, in order to save as much as possible for the future.

While you are young and premiums are low in life insurance, and you are still in such condition of health as to give you ready acceptance into the best companies, and you have been in business a few years with fairly easy circumstances, and are able to afford it, I would then advise you by all means to take out a ten- or fifteen-year endowment policy. The premium on this will greatly exceed your life policy, but you will now be better able to pay it. You should make the amount of your policy as large as you feel able to

pay the premium upon, without the possibility of embarrassing yourself financially. This policy will come due and payable to you at a time in your life, perhaps, when you need it most, and be invaluable to you and a credit to your foresight and good judgment. Besides, you could not invest your earnings in anything that would pay you so well.

There are, I understand, several kinds of endowment policies. I would, therefore, advise you by all means before investing in one to investigate thoroughly and ascertain from proper sources which is the most desirable. In all matters of this kind it behooves you to be prudent and cautious, as it is always the "first step that costs." Don't invest your money thoughtlessly and heedlessly in anything. Remember that when you part with your money you say "Good-bye" to your best friend.

Stocks are dangerous and often fatal to dabble in. Real estate is uncertain and troublesome, and unless you are a good judge of it and understand handling it, is not desirable. Besides, you may not be able to get sufficient money together in a lump at one time to make the first payment on a purchase of a piece of real estate. If you should happen to be so fortunate as to have a little stagnant capital you hardly know what to do with, or where to place it, in order to draw interest, and you finally put it in bonds, mortgages, ground rents, etc., they will pay you only 4 or 5 per cent. interest; so that I cannot call to mind anything that is better than life or endowment policies in good and reliable companies. This will absorb your small savings as fast as they accumulate, and you do not have to wait for a large aggregation of small amounts before you can make an investment.

I have written good and reliable companies. This is exceedingly important, as I know from very costly experience. Assiduously avoid all cheap and unreliable companies. The danger, however, of getting into such companies is not so great as it was some years ago, as the law and the rigid surveillance of the insurance commissioners, under which they are all obliged to operate, has pretty well weeded them out of existence. But I believe there are still some weak ones that make a judicious selection somewhat necessary.

I read a short time ago one of the most intelligent, interesting and able speeches upon the subject of life insurance by the Hon. Judson Harmon, Ex-Attorney General of th United States. It is

so much to the point and so logical and forcible that I cannot refrain from quoting part of it here:

"Want soon destroys the innocence of children, the chastity of women, the honesty, loyalty and self-respect of men. Its victims become worse than savages. The history of every community shows that the vicious and criminal come chiefly from families left unprovided for before they were capable of self-support. The poor widow has to struggle for her children's bread. She cannot train or educate them. So they are likely to become the prey of chance, which is usually evil. While this country abounds in employment and opportunities which are open to all, yet nearly all our people are dependent on their personal efforts from day to day . . The small number who possess the ability to gain a competence must have the time, and this may be cut short. And what are those who manage to lay something by from their savings going to do? There is a visionary or a rogue after every dollar, and if those are escaped it is hard to invest small amounts so as to make them both safe and productive. The purchase of life insurance furnishes the solution of the problem, and thus far the only satisfactory one. No one for whom insurance is possible has now any excuse for neglecting to secure it, when his life is a risk to others. If one does neglect it, when that is the only means of covering the risk, what Paul wrote to Timothy may well be applied to him: 'But if any provide not for his own, and especially for those of his own house, he hath denied the faith and is worse than an infidel.'" The above is the observation and comment of a keen observer, who is a student of the economic and sociologic conditions of the past and present.

After you have been in business long enough to learn whether your location is satisfactory or not, and you feel that you would like to remain permanently where you are, the best investment you could make, outside of life insurance, would be to purchase the property you occupy for yourself and family, providing you can buy it at a fair price and on satisfactory terms.

I will also call attention to another very substantial opportunity for investment, which I understand yields a good interest and has some other incidental advantages attending it, to those whose savings are small, namely, "the various building and loan associations." They are handy and convenient for the small investor and they are generally considered safe, if well managed. Occasionally we hear

of a failure, which should be a warning to all who cannot afford to take chances on the safety of their investments to be scrupulously particular to choose a thoroughly reliable company.

I do not consider building and loan associations as free from risk as life insurance, especially when care is taken to secure investments in the latter in companies whose published statements of assets and general financial condition assure us beyond doubt of their safety and stability.

There are, however, many persons whose general bad health and physical condition, family record, etc., are such as to disqualify them for admission into any good and desirable insurance company. In all such cases the building and loan associations are the next safest aud best paying investment for small amounts.

There is necessarily a great diversity of opinion amongst the most experienced and judicious business men as to the merits and demerits of the various schemes and opportunities offered to investors. It would be well for you to investigate and consider well the circumstances and terms upon which you invest your money. These remarks are simply suggestive and are intended to stimulate you to make an early and prompt investment of your earnings in some safe place where they will yield you the best interest before you may thoughtlessly spend them.

When a young man makes an investment in any enterprise and takes upon himself the responsibility of making monthly, quarterly or yearly payments, it is apt to have a very steadying and salutary effect on him and it may change the current of his whole life. It has a tendency to arouse in him ambition, awaken a spirit of enthusiasm and inspire him with hopeful visions of success. He sees in the distance cheering prospects and a bright goal which he resolves to attain.

The baseball, golf, football and other games; the theatres and other places of amusement and pastime are less frequently, if at all, attended. The habitue of the beer saloon, the race-track or gambling resort, if he has been a patron, will wonder at his absence. So he settles down and determines to become an earnest pharmacist and a good business man, goes to work with energy and renewed effort; attends strictly to business and becomes frugal and economical.

OINTMENT OF MERCURIC NITRATE.[1]

By Clarence O. Snavely.[2]

A CONSIDERATION OF THE OFFICIAL PROCESS WITH REFERENCE TO AN IMPROVED ONE.

Among the official preparations there are many of such inestimable value in the treatment of disease that we are puzzled oftentimes to understand why physicians will look elsewhere to find remedial agents the nature of which is a closely guarded secret. But, alas! there are many of these to be found who are even satisfied to consider such knowledge alienable. When a preparation receives a place in the United States Pharmacopœia, it has surely been deemed of sufficient merit.

Probably no official preparation has been more carefully studied than the familiar ointment of mercuric nitrate, or, as it is more commonly called (on account of its color) citrine ointment. Not only is it therapeutically of great importance, but also none the less pharmaceutically and chemically interesting. It is then with reluctance we would attempt to suggest changes relative to a preparation than which there is none more difficult in the United States Pharmacopœia to make, and which might present, after suggesting changes, similar difficulties to encounter by all who find such in the present official formula.

In this ointment the base is a butyraceous substance, obtained through the action of nitric acid upon lard oil. The classic researches that have been made upon oils and fats from time to time have shown us that the effect of nitric acid upon fixed oils depends not only upon composition of the latter, the presence of coloring matter, etc., but likewise upon the strength of the acid and the *temperature.*

That principle of fixed oils, whether of animal or vegetable origin, which is liquid at ordinary temperature, is termed olein, or *elain.* It is extremely difficult to obtain olein pure, as it is almost

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[1] Read at the twenty-seventh annual meeting of the Pennsylvania Pharmaceutical Association, June 21–23, 1904.

[2] The authorship of this paper is credited to Mr. J. H. Redsecker, Lebanon, Pa., in the recent Proceedings of the Pennsylvania Pharmaceutical Association, but this is erroneous, as we are assured by Mr. Redsecker, he merely having presented the paper in Mr. Snavely's behalf.

invariably accompanied by the concrete principles of oils, either stearin or palmitin, or both. A glance at the empirical formula of olein $C_3H_5\ (OC_{18}H_{33}O)_3$ at once reveals to us the fact that it is an oleate of the triad radical glyceryl, C_3H_5.

By reaction with nitric acid, or more exactly speaking, under the influence of nitrous acid fumes, olein is converted into a deep yellow, butyraceous mass. If this be treated with hot alcohol, a deep orange-red oil is dissolved, and a peculiar fatty matter remains, called elaidin. This is white, crystalline, fusible at 34° C., and appears to be isomeric with olein. The solid fat then which forms the base of our ointment is elaidin, accompanied by red oil. The result of the action of nitric acid upon lard oil, then, is a mutual decomposition of the acid and the fat, producing nitrogen dioxide, this becoming the tetroxide, and the transformation of triolein into its isomer elaidin. In the next place the reaction is characterized by a violent evolution of volatile products. These volatile products are[1] a number of the volatile fatty acids of the series $C_nH_{2n}O_2$, from acetic to capric inclusive, together with the dibasic acids, adipic and sebacic, of the series $C_nH_{2n-2}O_4$. Unquestionably the most desirable starting point for the production of elaidin and red oil is olein of animal origin, and recognized in the United States Pharmacopœia as lard oil.

The higher-priced fats frequently suffer adulteration with cheaper ones, and owing to the similarity of composition, such admixtures are difficult to recognize. The fact that dealers in petroleum oils sell large quantities of lard oil has, no doubt, led many pharmacists to look about for substitutes for lard oil in the preparation of this ointment, presuming that lard oil would be adulterated to a shameful degree; but this oil, and that, too, of excellent quality, is to be had notwithstanding that fact.

Several years ago I set out to procure samples of lard oil to be used in making citrine ointment, since up to this time, and I believe for twenty-five years, this ointment had been made with fresh unsalted butter by Dr. Geo. Ross & Co. The very first sample, upon critical examination, proved of excellent quality; whereupon I procured a larger quantity of the oil. Lard oil is defined by the Pharmacopœia as "A fixed oil expressed from lard at a low tem-

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[1] Witthaus, Manual of Chemistry, p. 266.

perature." Its properties are those of a colorless or pale-yellow oily liquid, having a slightly fatty odor, a bland taste, etc. Its composition is chiefly olein, with variable quantities of palmatin and stearin.

It seems, too, that the proposed changes in the bases of the citrine ointment have resulted from a disregard of several important facts. First, that we have in lard oil a colorless or pale-yellow substance, and forgetting that the effect of nitric acid upon fixed oils depends not only upon their composition, but also upon the presence of coloring matter. In the second place, the comparative simplicity of the product excluding as far as possible complicated and not thoroughly understood reactions. Third, that these existing natural impurities, stearin and palmatin, permitted by the United States Pharmacopœia, can be augmented to a certain degree, if it should be desired, without very materially altering or introducing more complex reactions. Such a procedure as the latter is, however, under no circumstances recommended.

Many fats and mixtures of fats have been proposed to replace lard oil, and resulting, perhaps, in as many failures to produce a satisfactory product; just what happens when temperature is disregarded and the thermometer ignored in carrying out the official process. Suffice it to mention but a few: Olive oil and lard, lard, butter, lard oil and lard, etc.

Not infrequently is there lodged complaint against the official ointment that it remains too soft, which may be overcome in a measure by the use of a formula given below. The proportions[1] of lard and lard oil used by a certain experimenter, who found after a consideration of various fats and mixtures of fats, including the one hinted at above, none as satisfactory as lard oil, a conclusion in which we certainly concur, could not be ascertained, or they should have been used here for a comparative study.

The official formula as it would stand modified follows:

Mercury	70	grammes.
Nitric acid	175	"
Lard (anhydrous)	150	"
Lard oil	610	"

"Heat the lard oil, in a glass or porcelain vessel, to a tempera-

[1] Reichard, AM. JOUR. PHARM., Vol. 55, pp. 438 *et seq.*

ture of 100° C. (212° F.); then withdraw the heat, gradually add 70 grammes of nitric acid, and, when the reaction moderates, reapply the heat until effervescence ceases." (It may now be stirred gently once or twice while cooling, but not vigorously, as has been recommended.) "Then allow the mixture to cool to 40° C. (104° F.). Having dissolved the mercury in the remainder of the nitric acid with the aid of sufficient heat to prevent the solution from crystallizing, add this solution to the mixture." Now raise the temperature to 60° C., add the lard, which at this temperature will melt and permit of thorough incorporation, and maintain the temperature until no further evolution of gas takes place, thereby obviating the tendency to form a spongy mass. "When the mass has become entirely cold, mix it thoroughly by trituration, avoiding the use of a metallic spatula."

The reaction for the production of mercuric nitrate in the process is as follows:

$$3Hg + 8HNO_3 = 3Hg(NO_3)_2 + N_2O_2 + 4H_2O$$
$$6Hg + 8HNO_3 = 3Hg_2(NO_3)_2 + N_2O_2 + 4H_2O$$

If the solution of the metal is effected in contact with the acid at the ordinary temperature,[1] it is positively certain, as seen by the foregoing reaction, that both mercuric and mercurous nitrate form, consequently the ointment receives both nitrates from the beginning. At the same time there is produced the colorless gas nitrogen dioxide (N_2O_2). When this colorless gas comes in contact with air, it unites with its oxygen, forming red fumes of the tetroxide (N_2O_4). Now upon mixing and stirring this nitric acid solution of mercuric nitrate with the fat, this nitrogen dioxide takes up oxygen from the air that is stirred into the ointment (for the more it is stirred the brighter yellow will be its color), and, whatever may be the effect of this gas as a most energetic oxidant, we are sure of the production of a decidedly more disagreeable odor than is given off under certain other conditions by the fatty base of this ointment.

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[1] It will, however, be found that when the solution of mercury in nitric acid is effected at the temperature of a water-bath or higher, and maintaining temperature about twenty minutes, no precipitation or cloudiness will occur in the solution on the addition of water, or of diluted hydrochloric acid (absence of mercurous salt).

We come now to the suggestion[1] long since offered, and at one time made use of, to remedy the difficulty in producing a solution of mercuric nitrate to replace that in the official formula.[2] Rother first suggested the use of red mercuric oxide dissolved in nitric acid to produce this solution. He had also pointed out that the solution prepared with mercury and nitric acid is in reality one of mercuric nitrate and mercurous nitrate, as our reactions above showed. He, too, has been accused of failing to state his reason for using a solution prepared by dissolving red mercuric oxide in nitric acid; but it can readily be seen that if we are to have an ointment of mercuric nitrate, it were far better we should start with a comparative simple solution and one containing only mercuric nitrate, than with the complex solution containing mercury in both its mercurous and mercuric states.

This investigator has pointed out another modification.[3] In this he proposes to use a larger portion of the nitric acid for the oxidation of the fat. By such treatment the oxidation of the fatty matter proceeds to the utmost capacity of nearly all the available nitric acid whereby violent reaction upon the addition of the nitrate solution to the nearly cold fat is precluded.

The formula to be suggested and recommended will, it is hoped, appear as a most logical deduction, while its manipulation must necessarily be productive of more uniform results. Notwithstanding the fact that it has been commented on before, the reasons here adduced in urging its adoption differ widely from those used before.[4]

Such is the formula which follows:

Red mercuric oxide	75·5	grammes.
Nitric acid	175·	"
Lard oil	760·	"

Heat the lard oil in a clean glass or porcelain vessel, to a temperature of 100° C. (212° F.), or the dish may be placed into a bath of hot water until the temperature of the oil has risen to about 100° C. (212° F.); then withdraw the heat, gradually add 100 grammes of nitric acid, and, when the reaction moderates, reapply

[1] Rother, AM. JOUR. PHAR., Third Series, Vol. 18, pp. 417 *et seq.*

[2] England, AM. JOUR. PHARM., Vol. 69, pp. 209 *et seq.*

[3] Rother, AM. JOUR. PHARM., Third Series, Vol. 18, pp. 417 *et seq.*

[4] England, AM. JOUR. PHARM., Vol. 69, p. 211.

the heat until effervescence ceases. Positively, at this point in the process, the liquid should not be disturbed by stirring. Now, when all the nitric acid has been decomposed, the temperature can be considerably raised without causing further effervescence, and the liquid simply boils. This elevated temperature may be maintained for ten or fifteen minutes, whereby the volatile fatty products will be more or less completely dissipated. Then allow the mixture to cool to about 40° C. (104° F.). Having dissolved the red mercuric oxide in the remainder of the nitric acid without heat, by adding the former to the latter in small portions, add this solution to the nearly cooled fatty product. Now raise the temperature of this mixture to 60° C., and maintain such until no further evolution of gas takes place, then withdraw heat entirely. When the mass has become entirely cold, mix thoroughly by trituration, preferably by the use of a glass rod.

The reaction in this process for the production of mercuric nitrate is as follows:

$$HgO + 2HNO_3 = Hg(NO_3)_2 + H_2O.$$
$$215{\cdot}76 + 125{\cdot}78 = 323{\cdot}58 \quad + 17{\cdot}96.$$

From the above reaction it will be apparent there still remains an excess of nitric acid over the amount required to bring the red mercuric oxide, the equivalent of the amount of metallic mercury in the official formula, into solution, but not so greatly in excess as it is found in the official process.

With the production of mercuric nitrate alone in this way, there is formed a little water, which, however, can be of no practical moment. It is not at all possible to introduce nitrogen tetroxide when this solution is used, though it does inevitably result from the mutual decomposition of the fat and acid; but in the latter instance its most energetic oxidizing action is, by reason of the elevated temperature, almost instantly utilized. When, on the other hand, this substance is introduced at a very much lower temperature the finished product gives off from the beginning rather disagreeable odors.

Even by permitting a larger portion of the nitric acid to react, with the lard oil the reaction is not final. Upon the addition of the acid solution of mercuric nitrate further action takes place far less intensely than when the solution with larger excess of acid is

added; whereupon the chances of reduction of the mercuric compound are fewer. The mercurous compound, if present, would even be more readily decomposed.

Unfortunately, of necessity, there remains to be noted here the fact that not infrequently red mercuric oxide is not completely soluble in nitric acid. This insoluble residue bears a resemblance to brick-dust. At the same time the slight advance in the cost of the oxide over that of the metal itself must be mentioned; this, certainly, should not militate against it, when its advantages are correctly estimated.

The salient points in the proposed process are:

(1) The use of a definite solution of mercuric nitrate.

(2) The use of a larger proportion of nitric acid to oxidize the fat.

(3) The production of an ointment true to the pharmacopœial name—Ointment of Mercuric Nitrate.

(4) A product to a greater degree devoid of odor.

(5) An ointment, assuming the existence of a combination of mercury with elaidic acid,[1] which, from the viewpoint of therapeutics, is physiologically more active, while it exists in its mercuric state alone, than when accompanied by a mercurous compound.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

TEN LECTURES ON BIOCHEMISTRY OF MUSCLE AND NERVE. By W. D. Halliburton. With illustrations. Philadelphia: P. Blakiston's Son & Co., 1904.

This book contains the special lectures on the chemical aspect of muscle and nerve physiology, delivered by Professor Halliburton in London and New York City in 1903–1904. Professor Halliburton is well known for his own researches as well as those of his students on this subject, and it is extremely fortunate that he has brought together the results as contained in some forty papers which are more or less scattered in different publications, and correlated them so that they may be of value to the animal physiologist and physician.

The subjects treated are: composition of muscle; heat vigor of muscle, euglobulins and pseudoglobulins; the pigment of muscle, properties of nucleo-proteids, the ferments of muscle; the extrac-

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[1] Witthaus, Manual of Chemistry, p. 226.

tives and salts of muscle; chemical changes accompanying the contraction of muscles, chemistry of tendon; the chemical composition of nervous tissues; metabolism in nervous tissues; the coagulation temperature of the nerve-proteids, and its bearing on the question of: (1) the galvanometric response of nerve under varying temperatures, (2) heat contraction in nerve, and (3) hyperpyrexia; the chemical pathology of certain degenerative nervous diseases; degeneration and regeneration of nerves.

The subjects are discussed in a most interesting and instructive manner, and the book will do much towards placing the treatment of disease on a still more scientific basis.

MANUAL OF PHYSIOLOGICAL AND CLINICAL CHEMISTRY. By Elias H. Bartley. Second edition, revised and enlarged. With 47 illustrations. Philadelphia: P. Blakiston's Son & Co., 1904.

There seems to be considerable difference of opinion as to just what should be the nature of the chemistry taught in medical schools. In successfully teaching applied chemistry it is important that the student appreciate the fundamental facts in physics and chemistry, and that he have good laboratory courses in elementary physics and chemistry. With this as a foundation, it will largely depend upon the training and duties of the professor as to whether he will limit himself to the teaching of the examination of blood, urine, fæces and milk, or whether toxicological and other sanitary analyses will be included. Perhaps it is not stating it too broadly to say that the medical man needs chemistry as much as he needs physiology. While he requires clinical chemistry, as considered by Dr. Bartley in this book, he also requires a broad knowledge of physiological chemistry, so that he can appreciate the effects of poisons and their antidotes, the action of medicines and their proper combination, etc.

The second edition of Dr. Bartley's chemistry is devoted to the examination of blood, urine, contents of stomach, fæces and milk. The subject-matter has been brought up to date, and will be found of value to the physician and analyst.

A SYSTEMATIC HANDBOOK OF VOLUMETRIC ANALYSIS, or the quantitative estimation of chemical substances by measure, applied to liquids, solids and gases. Adapted to the requirements of pure

chemical research, pathological chemistry, pharmacy, metallurgy, manufacturing chemistry, photography, etc., and for the valuation of substances used in commerce, agriculture and the arts. By Francis Sutton. Ninth edition, revised and enlarged. Philadelphia: P. Blakiston's Son & Co., 1904.

This work by Sutton is so well known that it hardly requires more than a mention. Dr. Knecht's process for the estimation of azo dyes, nitro- and nitroso-compounds by the use of titanous chloride is given on pages 366–369. A condensed record of analyses of various compounds existing in gas liquor and the methods of determining them as carried out by the Chief Inspector under the Alkali Works Regulation Acts has been included in this new edition (p. 77, etc.). Sodeau's gas apparatus, a modification of Macfarlane and Caldwell's apparatus, and adapted for gas analysis of the highest accuracy is described on pages 569–572. Throughout the book are numerous references to recent literature indicating that the book has been brought up to date, and thus it continues to be one of the most valuable all-around laboratory manuals on industrial chemistry in its many phases.

The Art of Compounding. A text-book for students and a reference book for pharmacists at the prescription counter. By Wilbur L. Scoville. Third edition, revised and enlarged. Philadelphia: P. Blakiston's Son & Co., 1904. $2.50, net.

One of the most hopeful signs in American pharmacy is the disposition of authors to write books which contain not only a new presentation of the subject but something also in the application, at least, that is new. Scoville's book has now gone through several editions, each of which has been wide awake to the present tendencies and needs of the pharmacist. One of the most happy introductions is the chapter on "Sterilization," etc. This is well written and is deserving of careful attention by the pharmacist. When the brewer, the bottler and even the farmer are practically carrying on work involving modern researches in bacteriology, surely the pharmacist should know how to preserve his drugs and preparations and dispense prescriptions that are free from harmful micro-organisms.

The chapter on tablets and the manufacture of compressed and triturate tablets will also be found valuable, as many pharmacists

are using tablet machines in connection with prescription work. The chapter on emulsions has been largely rewritten and includes the latest theories of emulsification, and also improved methods and formulæ for commercial emulsions.

THE AMERICAN YEAR-BOOK OF MEDICINE FOR 1905. A Yearly Digest of Scientific Progress and Authoritative Opinion in all branches of Medicine and Surgery, drawn from journals, monographs, and text-books of the leading American and foreign authors and investigators. Arranged, with critical editorial comments, by eminent American specialists, under the editorial charge of George M. Gould. In two volumes. Volume I, including *General Medicine.* Two octavos of about 700 pages each, fully illustrated. Philadelphia and London: W. B. Saunders & Co., 1905. Per volume: Cloth, $3 net; half morocco, $3.75 net.

In the present volume Dr. Gould has the co-operation of a corps of able collaborators who have summarized the researches in the different departments of medicine during the past year. Instead of these researches being disconnected they are brought into relation with each other and thus furnish excellent reading. The researches are brought under the following heads: General medicine; pediatrics; pathology and bacteriology; nervous and mental diseases; cutaneous diseases and syphilis; materia medica, experimental therapeutics and pharmacology; physiology; legal medicine; public hygiene and preventive medicine; and physiologic chemistry.

Considering the excellence of the work, the moderate price of the book, and the fact that much of the matter is of interest to biologists, chemists, analysts and lawyers, as well as members of the medical profession, it ought to appeal to a large number.

THE ELEMENTS OF CHEMISTRY. By M. M. Pattison Muir. Philadelphia: P. Blakiston's Son & Co., 1904.

The object of this work is to prepare the reader or student for research work. A good idea of the character of the work may be obtained by an enumeration of the subjects treated: (1) Some of the marks of those changes the elucidation whereof is the subject of chemistry. (2) The study of composition; the laws of chemical combination. (3) The determination of the combining weights of elements, and the reacting weights of compounds; chemical sym-

bols and formulæ. (4) Introduction to the study of interactions, and the connections between them and compositions; acids, basic and acidic oxides; metallic and non-metallic elements. (5) Chemical nomenclature. (6) Oxygen and hydrogen. (7) Compounds formed by the union of hydrogen and oxygen; water and hydrogen peroxide. (8) Hydrogen and some of its compounds. (9) Sulphur and some of its compounds. (10) Potassium and sodium and some of their compounds. (11) Iron and a few of its compounds. (12) The chemical character of metals and non-metals illustrated by certain compounds of manganese and some compounds of chromium. (13) Chemical characters of elements illustrated by oxides of antimony, arsenic, bismuth and tin. (14) Chlorine, bromine, fluorine, and iodine; and some of their compounds. (15) Oxidation and reduction; oxidizers and reducers. (16) The molecular and atomic theory. (17) Some applications of the molecular and atomic theory, chiefly to classes of facts already considered. (18) Isomerism and structural formulæ. (19) The periodic law. (20) The measurement of the thermal values of chemical changes. (21) Phosphorus; its oxides, hydrides, and some of its acids. (22) Carbon, silicon and a few of their compounds. (23) Magnesium, zinc, cadmium, and mercury; calcium, strontium and barium. (24) Some of the physical and chemical properties of copper, lead and aluminium. (25) A few physical and chemical properties of palladium and platinum. (26) Argon and its companions. (27) Short descriptions of the general chemical characters of each of the eight groups of elements.

We rather like the treatment of the subject of chemistry as given by Muir. There is a philosophic consideration of the subject which is too often lost sight of in the practical applications that are usually demanded and which have made chemistry so fascinating to students and the public alike. The author has collected a vast amount of information and presented it in a very interesting and instructive manner.

A PORTRAIT OF PROF. CHARLES F. CHANDLER was presented to Columbia University by the Alumni Association of the Schools of Science of Columbia University on Thursday evening, April 27th. Professor Chandler is one of the founders of the School of Mines of Columbia University and this is a worthy tribute to his attainments.

PHILADELPHIA COLLEGE OF PHARMACY.

MINUTES OF THE ANNUAL MEETING.

The annual meeting of the members of the College was held on March 27, 1905, at 4.00 P.M., in the Library. The president, Howard B. French, presided. Twenty-three members were present.

The minutes of the quarterly meeting held December 27, 1904, were read and approved. The minutes of the Board of Trustees for the meetings held December 6, 1904, January 3d, January 17th, (special meeting), February 7th, were read by the Registrar and approved.

The President read his annual report, from which are abstracted the following items: The walls, ceiling and woodwork of the pharmaceutical laboratory were repaired and painted; the seats in the lecture-rooms were re-varnished and numbered, and re-wired for electric lighting; a general overhauling of all electric wiring throughout the buildings was made, and, after inspection, has been approved by the Board of Fire Underwriters; a system of intercommunicating telephones was placed throughout the building, and has materially added to the comfort of the faculty and Registrar; the exterior woodwork of the front building has been painted and put in good order; these improvements put your buildings in a fairly good condition.

It is a matter of interest to note that Prof. Samuel P. Sadtler has completed twenty-five years of service in the College.

The new course in pharmaceutical arithmetic, which was made compulsory for the first-year students, has proven a very desirable addition.

The supplementary course for the third-year students, which has just gone into effect, is expected to prove of material advantage to the students.

A new system of tickets was instituted. One ticket is now issued by the Registrar, which takes the place of the six formerly used. This change has proven exceedingly satisfactory.

Forty-one more students are receiving instruction at the College this year than last. Eighty-one students have availed themselves of special instruction in the chemical laboratory. A number of the students are receiving additional instruction in the pharmaceutical laboratory, special course in bacteriology and in technical microscopy.

The College has lost by death during the year five honorary members and three active members. During the year eight active members and five associate members were elected. There have been two resignations.

During the year the "Troth" scholarship was established by Mrs. John R. Drexel in honor of her father, William P. Troth, and her grandfather, Henry Troth. The latter was an early member of the College, and served as vice-president from 1829 to 1841.

In educational matters the College has maintained its former high rank among pharmaceutical colleges, and the hope is expressed that the time is not far distant when research laboratories may be established in connection with the College.

The activity and able management of the Alumni Association is commended.

Reports of committees were then given as follows:

PUBLICATION COMMITTEE—Samuel P. Sadtler, chairman, reported: There has been an increase in the amount received from subscriptions, the sale of back numbers and reprints. On two occasions larger editions of the JOURNAL were printed. The number of unsold volumes on hand is estimated at 1,975, covering the period from 1829 up to the present time. There is a constant demand for back numbers, and as we have not a complete set of the JOURNAL for sale at the present time, we would particularly request the members to let the committee know when any volumes for 1829, 1830, 1831, 1833, 1834, 1835, 1842, 1846, 1847, 1856, 1865, 1876, and the four preliminary numbers published previous to 1829, can be obtained.

During the year back numbers have been presented by H. N. Rittenhouse, James T. Shinn, George J. Scattergood and Mr. Zeller.

EDITOR'S REPORT.—Prof. Henry Kraemer said that during the past year there has been no lack of original matter for publication; about seventy original papers were printed, being an average of about five or six papers an issue. They have nearly all been of a high order of merit, and have covered a wide range of subjects.

COMMITTEE ON PHARMACEUTICAL MEETINGS.—Joseph P. Remington read the report of the committee. "The meetings have been held regularly during the year. In compliance with the wishes of some of the members, three of the meetings have been held in the evening, and, judging from the attendance, it would seem desirable to hold some of the meetings in the future in the evening. The

meetings this year have been more or less in the nature of symposiums, one principal topic being taken for discussion and considered from different points of view. The meetings have been unusually interesting and profitable, and we are indebted to those who have contributed papers, taken part in the discussion, or in other ways helped to make them a success. The committee not only urges the members of the College to attend these meetings, but would welcome any suggestions tending to increase interest in them."

LIBRARIAN'S REPORT.—Thomas S. Wiegand said: "There have been added to the Library thirty-five new-bound volumes by purchase, and 105 volumes bound; these latter being mostly exchanges received for the AMERICAN JOURNAL OF PHARMACY. There has been expended for books and binding, $552.09. The Library is frequently consulted by persons desiring information, finding works on our shelves which they cannot find elsewhere in the city."

CURATOR'S REPORT.—Joseph W. England said: "The Museum of the College is in good condition. When additional shelf room is secured it might be well to consider the propriety of adopting a standard-sized container for specimens, and re-arranging the collection. With the advent of the forthcoming issue of the U. S. Pharmacopœia, it will be necessary to bring the students' collection of vegetable drugs in the students' reading-room up to date."

The Historical Committee reported verbally through Professor Remington that the work was being rapidly pushed.

Under new business, Professor Remington read the resolutions presented by the committee, to whom had been referred the subject of preparing resolutions on the death of Prof. Albert B. Prescott and Dr. Frederick Hoffman, honorary members of the College, which were adopted, and the Secretary was directed to forward copies to the Faculty of the University of Ann Arbor, Mich., and to the widows of our deceased members.

The election of officers and committees followed. Joseph W. England and Jacob M. Baer were appointed tellers, who, after a ballot, reported the election of the following: President, Howard B. French; First Vice-President, Mahlon N. Kline; Second Vice-President, R. V. Mattison; Treasurer, James T. Shinn; Corresponding Secretary, A. W. Miller; Recording Secretary, C. A. Weidemann; Curator, Joseph W. England; Librarian, Thomas S. Wiegand, and

The President appointed C. B. Lowe, Mahlon N. Kline, M. I. Wilbert, William McIntyre and Jacob M. Baer delegates to the meeting of the Pennsylvania Pharmaceutical Association to be held at Bedford Springs, June 20–22.

C. A. Weidemann, M.D.,
Recording Secretary.

ABSTRACTS FROM MINUTES OF THE BOARD OF TRUSTEES.

January, 1905.—Committee on Property reported that the greater part of the work attending the installation of a telephone system throughout the building had been done, and the phones would be in working order in a few days.

John W. P. Outerbridge, of Flatts, Bermuda, was elected an associate member.

February, 1905.—John J. Coleman, of Wheeling, W. Va., was elected to active membership.

March, 1905.—Committee on Library reported a number of additions to the Library, among them being the "Centenary of the Paris School of Pharmacy," a very valuable work, being splendidly illustrated and descriptive of their School of Pharmacy and allied branches. The death of Prof. A. B. Prescott, Dean of the University of Michigan, was reported. John F. Hancock, of Baltimore, Md. was elected to associate membership.

PHARMACEUTICAL MEETING.

The regular pharmaceutical meeting of the Philadelphia College of Pharmacy was held on Tuesday afternoon, April 18th, with Wm. McIntyre, a well-known member of the College, in the chair.

Joseph L. Lemberger, Ph.M., of Lebanon, Pa., was the first speaker on the programme, and read an interesting paper on "The Cultivation of Saffron in Lebanon County, Pa.," exhibiting samples

of the home-grown product and of the commercial article in connection therewith (see page 209).

During the discussion that followed Mr. Lemberger said that one of the favorite ways of adulterating saffron is to add some product to it which has been colored to resemble it. He said, however, that the adulterant, which is frequently colored by the use of aniline dyes, can usually be detected by placing a sample in the mouth, a very different color being imparted to the saliva than when true saffron is similarly tested. It was also noted that in France saffron which has been leached by the dyers of silk is added to the better grades. In answer to a question by Dr. Weidemann, Mr. Lemberger said that among the Pennsylvania Germans saffron is not only a common household remedy, but is also used as a flavoring and coloring material in cooking.

At this point Professor Kraemer exhibited a sample of cake which had been colored with saffron, and which was of a beautiful golden-yellow color. The sample was presented to him by Millicent L. Renshaw, P.D.

Mr. Wilbert alluded to a nursery rhyme which is still taught the children in the German families of the Mohawk Valley, and in which saffron is mentioned as an essential ingredient of good cake. He also referred to some experiments made by the late Charles A. Heinitsh, of Lancaster, Pa., in the gathering of saffron, whereby he found that 300 stigmas weighed 15 grains, and that it took 50,000 flowers to produce 1 pound of the drug. At that time Mr. Heinitsh estimated that about 40 pounds of the drug were produced in the two counties of Lancaster and Lebanon, Pa., annually.

Professor Lowe spoke of the work done by the late Professor Maisch in the detection of the adulterants of saffron, and said that among these was meat fibre, several factories in Germany having at one time been engaged in the manufacture of this adulterant.

Mr. Boring said that some years ago he had purchased a pound of saffron which was infested with animal life, and this he supposed to have been due to the presence of meat fibre.

Mr. Lemberger said that he had never seen but one sample of the drug which was adulterated with meat, and that owing to the exposition of this fraud, he thought it was probably not practised afterward.

Professor Kraemer alluded to some experiments which he had

made some years ago for determining the amount of adulteration in commercial saffron. It was found by the use of sulphuric acid, which turns the stigmas blue, that the better grades of commercial saffron contained as high as 92 per cent. of stigmas, while the cheaper grades contained as low as 45 per cent.

M. I. Wilbert, Ph.M., read a paper entitled "The Past, Present and Future of Pharmaceutical Titles in America." (See page 215.)

In discussing the paper, Dr. Weidemann said that he had also noticed that the title Doctor of Pharmacy did not seem to be generally recognized by the public, nor was it generally used by the graduates themselves. Sometimes it appeared on their signs, or on prescription blanks furnished by them. Likewise the old-time honored title Graduate in Pharmacy, which he rather preferred, appeared not to be much used.

Dr. Lowe thought that perhaps one reason for the graduates having the title Doctor of Pharmacy not using it more, was because they were afraid of opposition from physicians or of giving offense to them by the use of a title which might tend to the pharmacist being consulted for medical advice.

Prof. F. P. Stroup said that it was probably modesty on the part of some graduates. The title signified more, and, therefore, more would be expected from the pharmacist having it.

Mr. Wilbert said that with the establishment of departments of pharmacy in the universities, and also with the establishment of elective courses in science in the universities leading to the degree of Bachelor of Science, it is to be expected that the standard of pharmaceutical education will be raised, and that the future pharmacist will not only be a well-educated, but highly scientific man. He was of the opinion that the pharmacist should be educated along with other scientists, and suggested the title of Doctor of Science in Pharmacy as being an appropriate university degree for those students who have taken the special pharmaceutical courses.

A paper by J. B. Moore, on "The Importance of Insurance to the Pharmacist," was read in the absence of the author by E. Fullerton Cook, P.D. (See page 224.)

In opening the discussion on the paper Dr. Lowe said that he did not consider it advisable to take out a straight life policy. He said there was very little difference in the premium on a life policy and one on an endowment policy, and that the latter could be paid up

in a term of years. He did not advise too short a term, however, as the premiums are higher and it is well to let the insurance companies bear some of the risks.

Theodore Campbell, who was a sufferer from fire a few years ago, expressed himself as highly in favor of insurance. He said that it was important to insure fixtures as well as stock. He also emphasized the necessity for taking stock often, as this furnishes the only reliable basis on which the insurance company can estimate the loss. Mr. Campbell said that he understood that a few of the druggists in Philadelphia take stock every year, but that about 75 per cent. of them never do this.

Mr. Evan T. Ellis said that he believed in insurance provided the company was known to be reliable. He said that a director of the Penn Mutual Company had told him that policy holders get their money back with about 4 per cent. interest.

Mr. Boring said that if all of the losses and disappointments to policy holders could be published he thought we would have the Government back of the insurance business.

Mr. Cook spoke of an insurance company which enables its policy holders to invest in Government bonds, thus giving them additional security.

Mr. McIntyre said that it was a dangerous policy for a young man to become a capitalist rather than a business man.

A jar of the fruit from which nutmegs are derived, which was presented by James W. Gladhill, a graduate of the college, was exhibited.

In this connection Professor Kraemer called attention to some plant specimens which he had preserved by means of a saturated salt solution. He said that while making some experiments with seaweeds at the Marine Biological Laboratory (Wood's Hole, Mass.) for extracting the green coloring substance, he found that by first treating the material with salt solution and then with alcohol the chlorophyl could be extracted. He had found that the salt solution was also useful as a preservative, as it appeared to preserve the color better even than formaldehyde, and said that it could probably be recommended by pharmacists as a preservative for fruits, flowers and vegetables.

FLORENCE YAPLE,
Secretary pro tem.

ALBERT BENJAMIN PRESCOTT.
1832–1905.

THE AMERICAN
JOURNAL OF PHARMACY

JUNE, 1905.

ALBERT BENJAMIN PRESCOTT.[1]

By Oscar Oldberg.

The life of Prof. Albert B. Prescott, Dean of the School of Pharmacy of the University of Michigan, ended February 25, 1905. It was a life devoted to high ideals.

He was born at Hastings, N. Y., December 12, 1832; graduated in medicine at the University of Michigan in 1864; was assistant surgeon, U. S. V., 1864–5; became assistant professor of chemistry in the University of Michigan in 1865; professor of organic and applied chemistry in 1870; and Dean of the School of Pharmacy in 1876.

He received the degree of Doctor of Philosophy in 1886, and the honorary degree of Doctor of Laws was conferred upon him by the University of Michigan in 1896, and by Northwestern University in 1903.

He was president of the American Association for the Advancement of Science in 1891, the American Pharmaceutical Association in 1899–1900, the American Conference of Pharmaceutical Faculties in 1900, and of the American Chemical Society in 1902.

He became a Fellow of the Chemical Society of London in 1876, a member of the American Philosophical Society in 1898, and an honorary member of the British Pharmaceutical Conference in 1891.

He was an active member of the Committee of Revision and Publication of the Pharmacopœia of the United States from 1880 to 1890, and continued up to his death to freely render valuble services and advice sought from him by that committee.

He was the author of "Qualitative Chemical Analysis," 1874; "Outlines of Proximate Organic Analysis," 1875; "Chemistry of Alcoholic Liquors," 1875; "Morphiometric Processes for Opium,"

[1] Professor Prescott was elected an honorary member of the Philadelphia College of Pharmacy, March, 1902.—*Editor.*

1878; "First Book of Qualitative Chemistry," 1879; "Nostrums in Relation to the Public Health," 1881; "Manual of Organic Analysis," 1888.

His contributions to scientific periodicals were many, and he did a great amount of original research work. He always encouraged his more advanced students to undertake scientific investigations under his guidance, and much of their work was published. At the memorial exercises held February 28th at the University of Michigan in honor of Professor Prescott, his colleague, Dr. Victor C. Vaughan, presented an account of the scientific work of the departed. Dr. Vaughan referred to Prescott's researches into the composition of the alkaloidal periodides as probably his *opus magnum*. These researches extended through several years, and were carried out with the coöperation of several assistants, notably Dr. Harry M. Gordin.

Dr. Prescott rendered services of inestimable value to the progress of pharmacy, and the elevation of pharmaceutical education in America by his earnest and consistent adherence to high standards. The School of Pharmacy of the University of Michigan was the first university school of its kind in the United States. It offered a course occupying two full academic years devoted wholly to study and laboratory practice. Such a course had never before been attempted for the education of pharmacists in this country. The task of introducing it was a most difficult one in view of the absence of any definite educational requirements prescribed for pharmacists by law, so that very few students prepared to successfully undertake the programme of work laid out in a full two years' course could be found in the drug stores at that time. American pharmaceutical college education thirty years ago was almost wholly dependent upon concurrent drug store training, and the requirements for graduation in pharmacy, therefore, included it. But the School of Pharmacy of the University of Michigan opened its doors to students not employed in drug stores, but prepared and ambitious to devote their whole time for two years to study. Pharmaceutical education, including substantial laboratory courses, has at length become firmly established in the United States largely through the perseverance, tact and patience of Dean Prescott and those who followed in his footsteps.

Dr. Albert B. Prescott was a singularly unselfish, modest, helpul, generous and lovable man.

RESOLUTIONS ON THE DEATH OF PROFESSOR PRESCOTT.

Editor AMERICAN JOURNAL OF PHARMACY:

On the 25th of February Dr. A. B. Prescott, Dean of the Department of Pharmacy of the University of Michigan, passed away, and memorial services were held in Sarah Caswell Angell Hall on the 28th of February.

Fitting tributes were paid his memory by President Angell, Dr. Victor C. Vaughan, Dr. Herdmann and Professor Dooge, after which resolutions were read by Professor Schlotterbeck and Dr. Novy, for the Pharmacy and Medical Departments, respectively; and also resolutions by the presidents of the various classes of the two departments.

I enclose herewith resolutions from the Faculty and Senior and Junior classes of the Pharmacy Department, for publication.

Yours very respectfully,

J. O. SCHLOTTERBECK.

ANN ARBOR, MICH., March 11, 1905.

WHEREAS, the Faculty of the School of Pharmacy of the University of Michigan has sustained an irreparable loss in the death of its Dean, Albert Benjamin Prescott; and,

WHEREAS, The Faculty of the School of Pharmacy wishes to record its deep sense of sorrow, caused by the removal from its midst of a wise leader and a beloved colleague who for more than a quarter of a century has labored earnestly and unceasingly for the advancement of pharmaceutical education and for the welfare of the School of Pharmacy, be it therefore

Resolved, That by the death of Albert Benjamin Prescott, to whose efforts and labors the School of Pharmacy owes its high standing in the educational world, it has lost a most valuable executive, one whose sterling and unselfish qualities have gained the lasting respect, admiration and love of every one with whom he came in contact; and

Resolved, That his colleagues and students will ever carry the recollection of that kindly face, that cordial and considerate manner, that forgetfulness of self in thoughtfulness for others, as a cherished and tender memory and inspiration to better work and a better life; and be it further

Resolved, That a copy of these resolutions be spread upon the minutes of the Faculty, and also that a copy, with the assurance of our profound sympathy, be conveyed to the bereaved family.

Signed: J. O. SCHLOTTERBECK, E. D. CAMPBELL, L. S. BIGELOW.

Inasmuch as it has seemed best to Divine Providence to take from our midst, our revered and beloved professor and Dean, Dr. Albert Benjamin Prescott, be it

Resolved, That in the death of Dr. Albert Benjamin Prescott the members of the senior class of the School of Pharmacy of the University of Michigan have lost a kind and loving friend, teacher and guide whose life and successes may well be a model for all.

Resolved, That we tender to his family our heartfelt sympathy in this their hour of grief, and be it further

Resolved, That a copy of these resolutions be sent to the family and preserved in the archives of the School of Pharmacy and published in the college and pharmaceutical journals.

CORNELIUS J. DUTMER, FLORENCE M. MEEK, JAMES T. BOWLES.

WHEREAS, It has pleased the Almighty God to fulfil and perfect the illustrious life of Dr. Albert Benjamin Prescott, and

WHEREAS, His distinguished services to the profession of pharmacy, to the University of Michigan and to the individual members of the School of Pharmacy, have become a lasting and priceless treasure, and

WHEREAS, His pure and noble character, lofty ideals and kindly nature will ever be an inspiration to us for greater and nobler efforts; therefore be it

Resolved, That in the death of Dr. Albert Benjamin Prescott the University, and especially the students of the School of Pharmacy, have lost a most kind and loving friend and teacher, and be it

Resolved, That we, the students of the junior pharmacy class, herewith express our keen sense of the loss we have sustained, and wish to convey our deepest sympathy to the bereaved family in this their greatest sorrow, and be it

Resolved, That a copy of these resolutions be sent to the family, to the University and to the pharmaceutical and city publications.

Committee on resolutions:

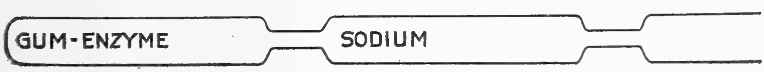
GEORGE B. MORRIS, FRANK S. SCHANHER, ROBERT A. HOLBROOK.

NITROGEN IN GUMS.

By A. B. Stevens,
Pharmaceutical Institute, University of Bern, Prof. A. Tschirch, Director.

I became interested in the tests for nitrogen while conducting research work upon Japanese Lac,[1] a product of *Rhus vernicifera,* which contains, in addition to other constituents, a gum and an oxidizing enzyme. The gum and enzyme can be obtained as a white powder by extracting the resin with alcohol, dissolving the residue in water and precipitating with alcohol. By re-dissolving and re-precipitating two or three times, it can be obtained perfectly white. Finally wash with ether and dry in an exsiccator. When so prepared the enzyme is very active, rapidly changing tincture of guaiac to a deep blue color. If an emulsion is made with the gum-enzyme, water and the separated resin, it soon changes from yellowish-white to black. If a solution of the gum is boiled with water, it becomes entirely inactive. It is a generally conceded fact that all enzymes contain nitrogen.

The Lassaigne test for the detection of nitrogen is undoubtedly considered the most reliable. It consists in heating the substance with metallic potassium or sodium and converting the cyanide so formed into Prussian blue. This test was applied to the gum-enzyme, but failed to detect the presence of nitrogen. According to Kehrer the Lassaigne test must be modified for certain pyrrol derivatives,[2] and cannot be applied to diazocompounds.[3] In view of the certainty of the presence of nitrogen and the general reputation of the test, it was repeatedly tried with various modifications. The gum-enzyme was previously mixed with dry sodium carbonate and carefully ignited. The rapidity of the heating was varied. In another experiment the substance was placed in a narrow tube closed at one end, and the tube drawn out to contract the opening, small pieces of sodium were then introduced and the tube again contracted, thus:



[1] A report of the work upon Japanese lac will follow later.
[2] Berichte, **35,** 2,525; 1902.
[3] Berichte, **17,** 1,178; 1884.

The sodium was first heated, then the gum-enzyme slowly heated so that the gases would pass over the glowing sodium. This test was repeated in the same manner, except that the gum-enzyme was first mixed with dry potassium hydroxide. In another experiment the substance was heated with a small quantity of concentrated sulphuric acid until a dry charred mass was obtained, then mixed with metallic iron and sodium and ignited, and finally tested for cyanide. In another experiment a modification of the Kjeldahl quantitative method was tried. The gum-enzyme was heated with concentrated sulphuric acid and a little mercuric oxide until a colorless solution was obtained. The solution was then mixed with an excess of potassium hydroxide and distilled. The distillate was passed through a tube containing a piece of red litmus paper into a mixture of chloroform, alcohol and potassium hydroxide to convert the ammonia into cyanide. The litmus paper remained red throughout distillation. All attempts to convert the nitrogen into cyanide failed.

Another test for nitrogen, which is considered less reliable than the Lassaigne test, is to convert the nitrogen into ammonia by heating the substance in a tube with soda-lime or potassium hydroxide. This test was applied to the gum-enzyme when the red litmus paper placed over the end of the tube rapidly changed to blue, but no odor of ammonia could be detected. The paper was evenly colored as if produced by some gaseous substance. The test was repeated with a pledget of cotton inserted in the tube below the paper to prevent the possibility of potassium hydroxide being mechanically carried to the litmus paper. The result was the same as in the previous test. A blank test was next made under exactly the same conditions, but with negative results. These experiments indicated the presence of a volatile base. Professor Tschirch thought the odor similar to pyrrol. I, therefore, repeated the test, placing in the top of the tube a pine shaving moistened with hydrochloric acid. This was rapidly colored red, thus strongly indicating, if not conclusively proving, the presence of pyrrol, or a pyrrol derivative. This was further confirmed by placing 5 grammes each of powdered potassium hydroxide and the gum-enzyme in a flask and distilling. The vapors were passed through a condenser connected with a dry flask, and this again connected with a second by means of a tube passing to the bottom of the flask

into a small quantity of water. At the end of the reaction the first flask contained a small quantity of colorless, strongly alkaline liquid, sparingly soluble in water, but readily soluble in alcohol and ether. The solution was tested with the following results:

On warming with hydrochloric acid and allowing to stand a short time a fine red precipitate separated. With sulphuric acid and quinone a green precipitate formed; with phosphomolydic acid, first a yellow, then a blue precipitate; with potassium ferrocyanide, dark green; with quinone alone, violet red. The contents of the second flask was also alkaline.

This proves conclusively that the gum contained nitrogen in some form, which is converted into pyrrol, or a pyrrol derivative, by heating with potassium hydroxide.

ATTEMPTS TO SEPARATE THE GUM FROM THE ENZYME.

Hikorokuro Yoshida states that by removing his so-called urushic acid with alcohol and extracting the residue with cold water, and then boiling the solution, a white precipitate is formed. He assumes that it is the enzyme, but does not prove it, except that the solution was active before boiling and inactive after boiling, and that the precipitate contained nitrogen. It may have been an inactive vegetable albumen, although he states that it contained less nitrogen than these bodies usually contain. I have found, however, that a solution of the purified gum obtained by repeated precipitation with alcohol remained perfectly clear on boiling; yet, previous to boiling, the same solution was strongly active, rapidly changing tincture of guaiac to dark blue, and the clear brown resin from the lac to a hard, black insoluble substance.

Solutions of the gum were treated with acetic, hydrochloric, nitric and sulphuric acids of various strengths and with varying degrees of heat, but each failed to separate the nitrogenous substance from the gum. In one experiment the solution was boiled for half an hour with a dilute sulphuric acid, precipitated with alcohol, dissolved in water and reprecipitated with alcohol, washed until free from sulphuric acid, and dried in an exsiccator. This still gave the pyrrol reaction. Fractional precipitation was tried without apparent change in the relation of gum to nitrogen. Cold saturated solutions of magnesium sulphate, ammonium sulphate and sodium phosphate were tried in vain. Various modifications of Almen's solution of tannic acid were tried, but in no case was there any separation of nitrogenous from non-

nitrogenous substance. Numerous precipitates were obtained, but in every case the precipitate contained both gum and nitrogen in apparently the same proportion as before. The dry powdered gum was heated for two hours at temperatures varying from 100° to 160° C., and tested both by boiling alone and with acids, but no separation occurred.

EXAMINATION OF OTHER GUMS.

A number of the following samples were prepared by students and kindly furnished by Professor Tschirch from his collection. The

No.	Gum From.	Prepared By.	Pyrrol Reaction.	Litmus	Enzyme
1	Japanese lac	Stevens	Very strong	Blue	Immediately
2	Ammoniac	"	Weak	"	30- 60 minutes
3	" select . .	"	Medium	"	15- 60 "
4	Acacia	"	"	"	8- 13 "
5	Asafœtida	"	Strong	"	1- 4 "
6	" select . .	"	"	"	1- 4 "
7	Olibanum	Oscar Halbey	Weak	"	60-120 "
8	"	" "	"	"	60- "
9	Opoponax	Knitl	"	"	30- "
10	Elemi	Dr. Saal	Strong	"	30 seconds—12 minutes
11	Myrrh	Bergmann	"	"	15- minutes
12	Chickle	Schereschewski	Weak	"	Inactive
13	Tragacanth, white . .	Stevens	Medium	"	"
14	" yellow .	"	"	"	"
15	" white .	"	"	"	"
	Acids prepared from:				
16	Acacia	Halbey	Medium	"	"
17	Opoponax	Knitl	Weak	"	"
18	Acacia	Stevens	Medium	"	"
19	Asafœtida	"	Strong	"	"
20	Japanese lac	"	"	"	"

remainder were prepared by the writer. In the case of the gum-resins the resin was removed by extracting with alcohol, the gum dissolved in water and precipitated by alcohol, purified by repeated precipitation and dried in an exsiccator. The acids were prepared by the same method, with the exception that the solutions were acidulated with hydrochloric acid each time before precipitation, and the

precipitate finally washed with alcohol until free from hydrochloric acid. Nos. 13 and 14 were prepared by dissolving the tragacanth in a warm solution of sodium hydroxide, precipitating with alcohol and dissolving in water, and reprecipitating with acidulated alcohol.

Each sample prepared without heat was tested for enzyme, and all were tested by heating with potassium hydroxide and testing the vapor for alkalinity and by the pyrrol reaction. The enzyme's activity will be indicated by the time required from the addition of the tincture of guaiac to the first appearance of color and afterwards to time required to produce a given shade.

Nos. 8, 9 and 11 did not become as dark as standard, even after standing twenty-four hours. Heat was used in the manufacture of No. 12, which would have destroyed the enzyme had it been present.

As the acids prepared from active gums did not give the enzyme reaction, it is evident that the hydrochloric acid used in their preparation destroyed the enzyme, but did not remove the nitrogen.

The enzyme in a solution of the gum from Japanese lac was rapidly destroyed by boiling, but the powder, after heating for two hours at 100° C., was still more active than any of the other gums examined. The color with tincture of guaiac appeared at once, and in five minutes became dark blue. Another sample, when heated for two hours at 120° C., required ten minutes to produce the same deep blue shade. A third sample, heated for two hours at 140° C., required ten minutes to produce any color, but became dark blue in thirty minutes. A fourth sample, after heating for two hours at 160° C., was inactive.

CONCLUSIONS.

That all gums contain nitrogen, either in combination or in intimate association.

That all true soluble gums possess in a greater or less degree the properties of enzymes.

By comparing the strength of the pyrrol reaction with the activity of the enzyme, it appears that the activity of the enzyme in gums varies in proportion to the amount of nitrogen present.

That if enzymes and gums are two distinct substances, there is at present no known method of separation.

That since gums or the acids prepared from them cannot be obtained entirely free from nitrogen, it follows that previous elementary

analyses must be verified. It is possible that in some cases the amount of nitrogen present has been so small that it has not materially affected the relation of carbon, hydrogen and oxygen.

Further investigations upon this subject will be continued as time permits.

ZINC DUST.

By A. B. Stevens.

Before using zinc dust in some experiments upon the gum obtained from Japanese lac I wished to be sure that it was free from nitrogen; I therefore subjected the zinc dust to the following tests, the results of which may be of interest to those who frequently use it in connection with organic substances:

When heated with potassium hydroxide it formed ammonia. When heated alone it also gave off ammonia. This led to the belief that nitrogen in some form had been absorbed from the atmosphere, and might be removed by heat. A small quantity was therefore placed in a loosely covered crucible, and strongly heated for half an hour. When cold it was tested for nitrogen by heating with potassium hydroxide. Its vapors rapidly changed litmus paper from red to blue. Upon the suggestion of Professor Tschirch a sample was thoroughly washed with water acidulated with hydrochloric acid, but this failed to completely remove the nitrogen.

As zinc dust is manufactured by heating zinc oxide with coal, it was believed that part of the nitrogen might consist of condensation products from the coal. Therefore a sample was placed in a long tube and percolated with ether. The ether when evaporated left a yellow, non-saponifiable oil, with an odor and fluorescence similar to petroleum. The oil, when heated with dry potassium hydroxide, gave off alkaline vapors, and the zinc in the percolator was still found to contain nitrogen. The greater portion of the oil appeared to be removed with the first portion of ether, but after continued percolation the ether left a residue upon evaporation, and it was evident that a much larger amount of ether was necessary for complete exhaustion, therefore a smaller sample, from a can of zinc dust which had been in the laboratory for more than ten years, was treated with ether in the same manner, and the powder tested from time to time. After using a large amount of ether the zinc was

practically free from nitrogen, yet by taking a large amount of the zinc and heating with potassium hydroxide in a tube partially closed at the top so that all of the vapors came in contact with the litmus paper, the color was slightly changed, thus showing a mere trace of nitrogen. This sample was then allowed to stand in an open flask for a few days when it gave a decided ammonia reaction, thus showing that zinc dust rapidly absorbs nitrogen from the air.

The fact that only a portion of the nitrogen in zinc dust is removed by heat indicates that the nitrogen is present in more than one form. This theory is also supported by the following experiments:

A fresh sample of zinc dust was washed with water, the washings giving a decided ammonia test. The washing was continued as long as traces of nitrogen could be detected in the washings. It was then treated in the same manner with very dilute hydrochloric acid. By adding potassium hydroxide in excess to the acid solution and allowing to stand a few minutes until the precipitate settled, decanting the clear solution and boiling, the vapors gave the odor of ammonia and rapidly changed litmus from red to blue. Washing with acid was continued until the washings no longer gave a test for nitrogen. The zinc was then washed with water until free from acid, and rapidly dried in a drying oven, and at once extracted with ether, the ether evaporated and tested for nitrogen as above. Nitrogen was found to be present, though not in as large amounts as in the oil from the first sample examined, which was, however, directly treated with ether.

Three samples were examined: one from a large closely covered can which has been in use in the laboratory as above stated; another from a glass bottle which has been in the museum about fifteen years, and a third which was ordered by Professor Oesterle for these experiments. Practically the only difference found in the three samples was that the oil from the fresh sample was decidedly yellow, while that from the laboratory sample was somewhat lighter, and that from the museum sample was colorless.

Dr. Victor Steger ("Metalldämpfe in Zinkhütten," Chemischer und Chemischtechnischer Vorträge) gives the results of several analyses of zinc dust, some of which contain considerable insoluble residue consisting principally of carbon. To determine to what extent this was present, a large amount of zinc dust was treated with hydrochloric acid. At first the reaction was rapid, but after a time

ceased. The solution was decanted and fresh acid added, but as the reaction was very weak the mixture was heated. Even then a large amount remained undissolved. A few drops of copper sulphate solution were added and digested for several days, but a large amount remained insoluble. This was washed with water until free from acid, dried, and percolated with ether, which upon evaporation left a colorless oil. Upon removing the ether the zinc dissolved without difficulty in hydrochloric acid, conclusively proving that this sample contained no carbon, and that the insolubility was due to the presence of the oil.

PHARMACEUTICAL INSTITUTE, BERN,
April 18, 1905.

SOME ALKALOIDS OF THE DEATH CAMAS.

BY HENRY B. SLADE.

The death camas, the Wa-i-mas of the Nez Perce Indians, has long been known as a powerful drug, and has been the subject of a number of chemical and pharmacological investigations. At the suggestion of Prof. V. K. Chesnut, who had isolated a veratrine-like alkaloid from the leaves of *Zygadernus venonosus* while in charge of the investigation of poisonous plants in the U. S. Department of Agriculture, an examination of the bulbs has been made and the results of a short study are here given in brief.

Fifty grams of the air-dried powdered bulbs, representing some 250 grams of fresh material, were extracted with ether, which yielded a crop of fine needle-like crystals along with yellow amorphous matter. These crystals, with concentrated sulphuric acid, gave a fine violet coloration, developing from a yellow color. Their solubility in ether, separation in crystalline form and color reaction with sulphuric acid, suggest sabadine. The solution of crystals in ether, together with impurities, was shaken with a weak solution of tartaric acid in water, whereby the alkaloid was taken up in the water solution, while the fats, coloring matters and other impurities were left in the ether. The solution of the alkaloid was acidulated with sulphuric acid to strong acid reaction, and the alkaloid precipitated with phospho-tungstic acid. The moist precipitate was mixed with sodium carbonate, which set free the alkaloid from its combination with the acid, and the alkaloid recovered by taking up

with ether. The residue from the ether consisted of a small amount of crystals in tufts of needles, which, with strong sulphuric acid, passed through shades of lemon-yellow, orange, bright red, rose-red and violet. A further extraction of the material with ether yielded almost pure crystals, which gave the same color reaction with sulphuric acid. The reactions are those of sabadine.

By further extraction of the ethereal residue after separating sabadine, a crystalline compound giving a permanent blood-red color with sulphuric acid was obtained. The amount was too small for complete identification, but this reaction is characteristic of sabadinine. The alkaloid was obtained by treating the acidulated solution with ether, rendering alkaline and again extracting with ether.

The powdered material, after extraction with ether, was boiled with 80 per cent. alcohol containing tartaric acid in the proportion of 1 gram of acid to 100 grams of material. The alcoholic extract was diluted with water, again acidulated with tartaric acid and shaken with ether, which removed most of the impurities. The alkaloid was then set free with sodium carbonate, extracted with ether and further purified by repeating the treatment with acid and alkali. The residue from the ether was amorphous and gave a fine blood-red color with sulphuric acid, developing from lemon-yellow, which quickly passed to an orange-red and blood-red, with a green fluorescence. Heated with hydrochloric acid, the alkaloid gave a yellow color which, on continued boiling, passed to a bright red, and, after standing for a short time, to a rose-red. After exposure to the air for several hours, the color changed to violet. A larger amount of the alkaloid, boiled with strong hydrochloric acid, became cloudy and separated a precipitate which redissolved on further boiling with a dark red-brown color, which changed to an olive-green on diluting with water. On exposure to the air the dirty olive-green solution assumed a violet shade, and in the course of an hour became a magnificent purple. Some of the veratrine alkaloids, after long exposure to the air in the presence of moisture, develop a violet color with mineral acids, but I have been unable to find any description of this particular reaction. With strong nitric acid the alkaloid yielded a fugitive rose color, changing immediately to a bright and permanent yellow. The alkaloid proved slightly soluble in water, and readily soluble in methyl, ethyl and amyl alcohol, ether, chloroform, benzol and acetone. The residues in every case, as

also from the acids, proved amorphous under the microscope. In a capillary tube the alkaloid commenced to darken at 141° C. and to clear at 145°. At 150° fusion was complete. With phospho-tungstic acid, potassio-mercuric iodide and iodine in potassium iodide solution, the solution of the alkaloid sulphate gave flocculent precipitates.

The properties of this alkaloid agree with those of veratralbine isolated by Wright and Luff from white hellebore *Veratrum album*. The melting-point of veratralbine is stated by these investigators to be 149° C. Salzberger considers veratralbine a decomposition product of his protoveratrine (Ing.-Diss., 1890). Veratralbine is the main constituent of the mixture obtained as also in *Veratrum Californicum*, a brief study of which was made in connection with some work on the stock-poisoning plants of Idaho. The toxicity of the alkaloid is established by the fact that 1 milligram killed a frog in two minutes after subcutaneous injection.

This preliminary study indicates the presence of at least three distinct alkaloids, sabadine, sabadinine and veratralbine, probably derived from protoveratrine.

UNIVERSITY OF ARIZONA, AGRICULTURAL EXPERIMENT STATION,
Tucson, Ariz.

PROF. CHARLES CASPARI, JR., Dean of the Faculty of the School of Pharmacy of the University of Maryland, had conferred upon him the degree of Doctor of Pharmacy, *honoris causa*, at the commencement of the University on May 13th. In conferring the degree Provost Bernard Carter said: "It is not the custom of the Maryland University to confer degrees *honoris causa*, but owing to the eminence which Professor Caspari has achieved in his profession, the Regents have deemed it wise to confer upon him, *honoris causa*, the degree of Doctor of Pharmacy."

On the evening of May 12th the Alumni Association of the Maryland College of Pharmacy, presented Professor Caspari a handsome silver service of eight pieces, as a testimonial in honor of his completion of twenty-five years of service in the college.

DR. WILLY MERCK, member of the firm of E. Merck, Darmstadt, had conferred upon him by the University of Halle, Germany, the honorary degree of Doctor of Medicine "in recognition of numerous meritorious contributions looking to the advancement of the therapeutic side of medicine."

THE USE OF COPPER IN DESTROYING TYPHOID ORGANISMS AND THE EFFECTS OF COPPER ON MAN.

BY HENRY KRAEMER.

It is said that "the life of a Londoner is worth ten to fifteen years' less purchase than that of the average provincial. This fact is due to many causes, but the chief among them is the quality of the water." The same could be said of the residents of many of our American cities. Yet the necessity for a pure-water supply has been recognized since ancient times, and enormous sums of money have been and are being spent in the control and purification of water supplies. Our failure to secure pure water has been largely due to ignorance on the one hand, in the past at least, and to mismanagement on the other. It was only in 1873 that Balfour Stewart[1] wrote:

> It is only very recently that we have begun to suspect a large number of our diseases to be caused by organic germs. Now, assuming that we are right in this, it must nevertheless be confessed that our ignorance about these germs is most complete. It is perhaps doubtful whether we ever saw one of these organisms, while it is certain that we are in profound ignorance of their properties and habits. . . . We are at any rate intimately bound up with, and, so to speak, at the mercy of, a world of creatures, of which we know as little as of the inhabitants of the planet Mars.
>
> Yet, even here, with profound ignorance of the individual, we are not altogether unacquainted with some of the life habits of these powerful predatory communities. Thus we know that cholera is eminently a low-level disease, and that during its ravages we ought to pay particular attention to the water we drink. This is a general law of cholera, which is of the more importance to us because we cannot study the habits of the individual organisms that cause the disease.
>
> Could we but see these, and experiment upon them, we should soon acquire a much more extensive knowledge of their habits, and perhaps find out the means of extirpating the disease, and of preventing its recurrence.

During the past thirty years, since Balfour Stewart wrote these lines, the whole subject of bacteriology has been developed and a distinct science has been created. In many industries bacteriologists are regularly employed to study the problems connected with them and to apply the results so obtained. In those industries which are in the hands of progressive private individuals and corporations, as of brewing, every scientific fact is considered on its merits and utilized if found applicable. On the other hand, the purification of

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[1] "The Conservation of Energy." Chapter I. (August, 1873.)

water supplies being, for the most part, in the hands of municipalities, there are many factors which enter into the problem and which render progress very slow. In this connection, however, it is gratifying to note that sufficient progress has been made, in New York City, for instance, to show that the problem is no longer to be considered a political or partisan one. In February of this year the newspapers[1] reported as follows:

> The spectacle of Mayor McClellan and his old-time rival, ex-Mayor Seth Low, appealing to the State Senate at Albany to-day in favor of the passage of the Mayor's bill to furnish New York City with a sufficiency of water, is a somewhat moving one. Mayor McClellan's argument in support of his own bill, according to reports, was no whit less earnest than that of Mr. Low. The non-partisan character of the Mayor's proposal was further attested by the fact that the measure was supported by members of the Low administration.

The problem of the purification of water supplies in the United States, barring for the time being the pollution caused by algae, may be said to consist essentially of a study of typhoid organisms and of devising measures for their eradication.

THE DISTRIBUTION OF TYPHOID ORGANISMS.

In the American edition of Nothnagel's Encyclopedia of Practical Medicine, in the volume on typhoid fever and typhus fever by Dr. H. Curschmann, edited with additions by William Osler, M.D., on page 38, it is stated:

> Under the most varied ordinary conditions (not induced experimentally) the typhoid bacillus is capable of surviving for days, weeks and months, and even for more than a year, and under favorable conditions, even throughout the winter. An additional conclusion is permissible, namely, that not alone the persistence of the germs, but also their dissemination through the media named is certain. If in this connection the liquid media in general predominate, the dry media are not to be left out of consideration. It cannot be denied that the contagium attached to particles of dust may be disseminated through the air to a limited degree.

We have, therefore, the highest authority for believing that, contrary to the usual acceptation, the typhoid organism may persist for a considerable period of time, and that infection may occur in very many ways, as through drinking-water, food, and even through the air. In my own experiments[2] I have found that at the ordinary

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[1] *Public Ledger*, February 22, 1905.

[2] Paper read at the general meeting of the American Philosophical Society, April 13, 1905.

temperature the typhoid bacillus will live over four months in both tap and distilled water, although the organism loses some of its characteristics after two months in that bouillon cultures will not give the agglutinating test with blood of a typhoid patient.

While the isolation of typhoid organisms from water is attended with considerable difficulty, still it has been supposed that when the water supplied a community is free from colon bacilli, it is likewise free from typhoid organisms; that is, the absence of colon bacilli is considered to mean the absence of sewage or fecal organisms. Some recent investigations[1] would seem to indicate that *colon bacilli* are more widely distributed than formerly supposed and that their presence in water may not always indicate fecal contamination. However this may be the absence of this organism must still be considered one of the best indications of an unpolluted water.

Next to water, milk is considered to be one of the most common sources of typhoid fever; but where the matter has been investigated it has been found that the milk was contaminated with water containing sewage organisms. Chapin, in his book on "Municipal Sanitation in the United States," page 511, cites an instance of this kind in the tracing of an epidemic of typhoid fever in Springfield, Mass., some years ago. He says:

> The contents of the privy were spread on a lot near the well, and the men walked over this in going to the well, and their boots were rinsed off on the planking over the well and the water below. In this water *Bacillus coli* was found. The cans of milk were cooled in this well and it was found that the water leaked into the cans. Another chance for contamination was directly from the infected hands of convalescents.

Oysters and shell-fish taken from beds near where sewage is discharged have also been found to be a source of the disease.

Recently it has been shown by Dr. Benjamin Lee,[2] of the Pennsylvania State Board of Health, that water-cress may collect a sufficient amount of extraneous organic matter containing colon bacilli to be a source of infection.

While it is usually conceded that typhoid organisms are chiefly disseminated through water and milk, yet the free use which is made of privy manure or night-soil in some localities as a fertilizer

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[1] Erastus G. Smith. Note on the occurrence on grain of organisms resembling the *Bacillus coli communis*. *Science*, **12**, No. 540, May 5, 1905, p. 710.

[2] Editorial comment in *Amer. Medicine*, November 26, 1904, p. 906.

on truck farms renders it probable that fecal bacteria, including typhoid, are disseminated through the use of garden vegetables. In many instances this manure is allowed to stand in large pools, and by means of dippers is sprinkled over the soil. In August, during the heavy rains, I have seen low plants like lettuce and spinach completely washed with this more or less dilute liquid manure.

The experiments of Dr. Lee show how difficult it is to wash out the organisms from cress, and the same would apply to vegetables like lettuce and celery, in the latter case the soil being sometimes heaped up around the plants to prepare them for the market. No doubt in many instances certain fruits, which are eaten in a raw condition, as tomatoes, apples, pears, etc., are sources of infection.

In a recent paper Dr. Barringer[1] gives a number of observations which tend to show that the dust from American railroad beds, through the discharge of typhoid patients while traveling over the roads when in the infective stage, is a probable source of typhoid infection, which has not been generally appreciated.

THE REMOVAL OR DESTRUCTION OF TYPHOID ORGANISMS IN FOOD AND WATER.

Heretofore there have been two principal methods for the removal of typhoid organisms from drinking-water, namely: (1) Filtration on a large scale, and (2) filtration and boiling on a small scale. Many bio-chemical methods for the purification of water have been proposed, some of which may be enumerated:

(1) Aqua regia followed by sodium carbonate.

(2) Bleaching powder followed by sodium bicarbonate.

(3) Various permanganates, as potassium, calcium, aluminum, or barium.

(4) Perchloric acid.

(5) Bromine followed by ammonia.

(6) Iron chloride and sodium carbonate.

(7) Sodium bisulphate.

(8) Peroxide of chlorine.

(9) Kerosene.

(10) Silver salts.

(11) The alum process has been used for purifying the water supplies of large cities.

[1] *The Virginia Medical Semi-Monthly*, February 12, 1904, p. 501.

The use of electricity (12), as also of ozone (13) has been proposed.

The use of copper (14) for the purification of water on a large scale was first proposed by Dr. Moore and Mr. Kellerman, in a bulletin of the U. S. Department of Agriculture a year ago. In a second bulletin issued some weeks ago the authors have confirmed the efficiency of copper in the purification of water contaminated by algæ. They also report in one instance the abatement of an epidemic of typhoid fever in New Mexico, after treatment of the water-supply with copper sulphate. At Columbus, O., the water was treated with copper sulphate during September, October, November and December, when the number of typhoid cases was reduced to from four to sixteen per month. The treatment was discontinued and the number of typhoid cases rose from 91 to 376 per month during January, February and March.

That copper has a marked toxic or oligodynamic action on fecal bacteria, including typhoid bacilli, has been known since the experiments of Israel and Klingmann[1] were reported in 1897, and their observations have been confirmed by Moore and Kellerman and by every one who has worked along these lines since.[2] I have found that when copper foil is allowed to remain in distilled water from one to five minutes sufficient copper is dissolved by the water to kill typhoid organisms within two hours.

THE EFFECTS OF COPPER ON LOWER ANIMALS AND PLANTS.

It is well known that the action of copper salts upon both plants and animals varies quite considerably. Seeds, for example, may be treated with quite concentrated solutions of copper sulphate without impairing their germinating activities. I have sprayed certain plants, as the common plantain and poison ivy, with 10 per cent. copper sulphate solutions without noticing any ill effects. Very many plants withstand spraying with solutions of copper sulphate containing as much as 1 part per 1,000. The effects vary greatly according to the conditions which surround the plant. Seedlings of pea and corn, for instance, are killed when placed in solutions of copper sulphate 1 part to 200,000; but when the seedlings are

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[1] *Virchow's Archiv*, **147**, 1897, pp. 293–340.

[2] See papers by M. E. Pennington, N. Gildersleeve and A. H. Stewart in *American Journal of Medical Sciences*, May, 1905, and by W. P. Mason, *Science*, April 28, 1905.

placed in soil containing 1 part or even more of copper sulphate in 2,000 parts of soil they remain uninjured.

Nägeli's[1] experiments, performed during the '80's, showed that certain unicellular plants, as the algæ, were killed by solutions containing exceedingly minute quantities of copper. His experiments have been repeatedly confirmed, and Israel and Klingmann observed a similar toxic action on other unicellular plants, notably some of the fecal bacteria and also on some of the unicellular animal organisms.

While there are these experiments showing that certain plants and animals are killed by solutions containing as little as 1 part of copper to 1,000,000,000 of water, still there are other plants which are stimulated and under certain conditions even appear to be benefited by its presence. Frank and Krueger[2] have shown that if potato plants are properly supplied with copper, the plants are hardier, yield a larger crop, and live longer than they otherwise would.

We may say in a general way that there are certain organisms which manifest a specific sensitiveness towards copper, including bacteria, one of the annelid worms, as well as other human parasites, while others are unaffected or even stimulated by relatively large quantities of copper sulphate. The unicellular organisms are the ones which appear to be most sensitive to the action of copper.

THE EFFECTS OF WATER TREATED WITH COPPER ON MAN.

While it has been conclusively shown that exceedingly minute quantities of copper are toxic to typhoid organisms, still the question is raised by some as to the toxic effects on man when copper or its salts is used in the purification of drinking-water. In commenting on a paper of mine on "The Efficiency of Copper Foil in Destroying Typhoid and Colon Bacilli in Water," a reviewer[3] writes as follows: "While recommending the use of copper foil for the purification of drinking-water, the writer adduces no proofs as to freedom from toxic effects when water so purified is taken into the system over a considerable period of time." My reason for not taking

[1] Ueber oligodynamische Erscheinungen in lebenden Zellen. *Neue Denkschriften der schweizerischen naturforschenden Gesellschaft*, **33-34** (1893-1895).

[2] *Ber. d. Deutsch. Bot. Ges.*, **12**, 1894, p. 8.

[3] *Medical Notes and Queries*, **1**, No. 3, March, 1905, p. 38.

up the pharmacological phase of this question heretofore has been that my own experiments in the consumption of water treated with copper foil did not extend over a sufficient period of time to warrant me in making any statements in regard to the effects of water so treated. Then, too, I felt that the statements of pharmacologists and physiologists were conclusive as to the probable harmlessness to man of copper when used in the proportions necessary to purify water containing typhoid organisms. But since there seems to be some objection in certain communities to the drinking of water treated with copper, I have deemed it advisable to give my own experience in connection with this subject.

For over six months all of the drinking-water consumed in my home has been treated with copper. A strip of copper foil, or sheet copper, 9 inches square, is placed in a vessel containing from 3 to 4 quarts of water and allowed to remain from four to eight hours. The foil is first cleaned with powdered pumice, and retains its lustre for weeks unless the water contains a considerable quantity of sediment, and provided the quantity of water is renewed immediately each time upon drawing off the sterilized water. On account of the varying amounts of sediment we find it desirable to filter the water before treating it with the copper foil. Up to this time no ill effects have been noted from drinking the water so treated, and, in fact, our general health may perhaps be said to be better than usual, in that we have not had to consult a physician during this time. Another interesting observation is that the water being more palatable than boiled water, we consume larger quantities, which possibly has some influence on the general bodily condition.

Believing, as I have already indicated, that many vegetables may also be a source of infection, we take the precaution either to wash the vegetables to be eaten raw in copper-treated water or to place them, particularly in the case of lettuce and celery, in a vessel of water along with a strip of clean copper foil and allow them to remain from two to four hours with occasional agitation.

The use of copper vessels would be more convenient, but of course is more expensive. I have also thought that water-pitchers and tumblers might be partly lined with pieces of copper foil.

I may say in addition that I know of a number of families who have been using copper-treated water for even a longer period of time without any untoward effects.

THE ELIMINATION OF COPPER FROM WATER.

Nägeli[1] discovered during the course of his experiments that a solution of copper that was toxic to Spirogyra could be rendered harmless by the introduction of a number of more or less insoluble substances. Among those which he used for this purpose were the following: Sulphur (either roll or flowers), carbon (either graphite or soot), coke, coal, peat, black oxide of manganese, starch, cellulose (either as Swedish filter-paper, or cotton, linen or wood fiber), silk, wool, stearic acid, paraffin, gum, dextrin, egg albumin, glue. True and Oglevee[2] have studied the influence of insoluble substances on the toxic action of poisons in solution, and have not only confirmed Nägeli's observation, but have shown that sand and powdered glass have the property of reducing the toxicity of solutions of copper. Moore and Kellerman have shown in their recent bulletin the relative decrease of the toxicity of copper sulphate solutions according to the amount of organic matter present, the amount of carbon dioxide dissolved in the water, or the temporary hardness of the water.

In addition, the copper is absorbed by the organisms which are killed, and is thus eliminated. It is, therefore, apparent that there are a number of ways by which the copper is removed from solution and the toxicity of solutions containing it lessened.

In the case of reservoirs treated with copper it is likely that none or very little copper remains in solution for any considerable period of time. By a combination of factors, such as (*a*) absorption by the organisms that are killed as well as by other organic matter; (*b*) by the formation of insoluble compounds with various inorganic salts; and (*c*) by adsorption by various insoluble materials, the copper is removed, so that by the time the water reaches the consumer there is probably no copper in solution, and the insoluble copper, if present, is necessarily more or less inert. Furthermore, I am of the opinion that there is more copper in solution in home-filtered water which has been treated with copper foil than in the water which reaches the consumer after treatment of a large reservoir with copper sulphate in the quantities proposed by Moore and Kellerman for the purpose.

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[1] *Loc. cit.*

[2] *Botanical Gazette*, **39**, 1905, pp. 1–21.

THE OCCURRENCE OF COPPER IN FOODS.

Among the other inorganic constituents which occur normally in the animal organism is copper, and its occurrence is so constant as to be spoken of as "normal copper." It is not known, however, what part, if any, it plays in metabolism. The amount normally present varies with the food and with the individual. There is considerable data showing that the amount of copper in vegetables varies according to the amount of copper present in the soil, and owing to its wide distribution in soil, it is found in many plants. It is, therefore, naturally present in many foods, and may run as high as 0·560 gramme per kilogramme of dried substance, or even 1 part in 1,785 parts, in plants growing near copper works, as shown by Lehmann.[1]

In addition, copper is added to many foods to enhance their appearance. The custom of greening vegetables has been followed in a commercial way for over fifty years, and laws are being enacted defining the limit of copper which is permissible in food materials. The Swiss and Italian Governments allow a quantity of metallic copper not to exceed 100 milligrammes per kilogramme (or 1 part in 10,000) in vegetable preserves. In France the question of re-greening vegetables by means of copper sulphate has received careful attention, and while the practice was prohibited by law in 1853, this prohibitory law was repealed in 1889. According to Leach: "Examination of a large number of brands of canned vegetables greened by copper, as bought in Massachusetts, showed that the amount used varied from a trace to 2·75 grammes per can, calculated as copper sulphate. . . . In the Massachusetts market labels like the following are not uncommon: 'This package of French vegetables contains an equivalent of metallic copper not exceeding ¾ of a grain.'" In Pennsylvania the law "permits articles of vegetable food to contain as much as $\frac{1}{50}$ of 1 per cent. of metallic copper," or 1 part to 5,000 parts of food.

The following table shows the amount of copper found in various substances. A key to the literature quoted is afforded by the numbers in parentheses.

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[1] "Hygienische Studien über Kupfer IV," *Arch. f. Hygiene*, **27**, 1896.

TABLE SHOWING THE QUANTITY OF METALLIC COPPER IN MILLIGRAMS FOUND IN A KILOGRAM OF VARIOUS SUBSTANCES EXCEPT WHERE OTHERWISE STATED.

Almonds (15)		36·8
" (15)		22·8
" (15)		26·5
Apricots (15)		1
Bael, liquid extract (27)	a[1]	
Barley (25)		10–70
Bean (8)	b[2]	
Belladonna (27)		4,200
" alcoholic extract (27)	a	
Blood, cephalopods (6)	b	
" crustaceans (6)	b	
" gasteropods (6)	b	
" ox (12)		·7
" " (12)		5·6
" " (12)		·011
" " (12)		·029
" " (12)		·003
" " (12)		·75
" " (12)		·6
" " (12)		·75
Brandy, sample No. 1 (18)		5
" " No. 2 (18)		1
" " No. 3 (18)		4
" " No. 4 (18)		1
" (17)		5–8
Buckwheat (25)		150-160
Cannabis indica, alcoholic extract (27)	a	
Carrots (8)	b	
Cherries (15)		2·3
Cinchona, liquid extract (27)	a	
Chinois, green (15)		47
" (15)		76·6
" green (15)		1·1
" yellow (15)		·9
" yellow (15)		56·1
Cimicifuga, alcoholic extract (27)	a	
Cocoa, pure, free from husk (18)		47
" containing sugar and starch (18)		58
" " " " " (18)		29
Coffee (21)	b	
Crabs, fresh-water (10)		20
" salt-water (10)		20
Cucumbers (15)		45
Currants (15)		8
Duck, wild (11)		8
Egg, yolk (11)		5·6

Egg, white (11)		7·2
" yolk (11)		2
" " (11)	b	
" " (11)		·55
Ergot, liquid extract (27)	a	
Figs (15)		15·1
" (15)		19
" (15)		17
Flesh, ox (22)		1
Flour (19)		·86
" (19)		1·18
Fucus vesiculosus, aqueous extract (27)	a	
Gall, beef (11)		3·4
" " (11)		·2
Gentian, aqueous extract (27)	a	
Glede, forked (whole bird) (12)		8·8
Gooseberries (15)		4·2
Grapes (Catawba) (19)		1·01
" " (19)		1·28
" (Concord) sprayed with Bordeaux mixture (19)		2·40
" " " " " " (19)		6·23
" " (19)		1·29
" " (19)		1·31
" (Malaga) (19)		1·10
" " (19)		1·11
" Pomace, 1 kilogramme (20)		5
" Product, 1 " (20)		·001
Green gages (15)		18
Guano, 1 kilogramme (26)		20
Hazelnuts (15)		3·1
Henbane (27)		3,600
Ipecacuanha, aqueous extract (27)	a	
Kidney, beef (12)		4
" cat (12)		3
" dog (12)		5·4
" hog (12)		8
" mutton (12)		3·8
" ox (12)		3·8–8
" rabbit (12)		3·8–8
" " (12)		8
" " half-grown (12)		3·4
" " " " (12)		2·2
" sheep (12)		3·8–8
Leaves of vines gathered near Pisa, Italy		·47–0·6
Lees, 1 kilogramme (3)		92
" 1 " (3)		81
" 1 " (3)		49
Lentils (25)		110–150
Licorice, aqueous extract (27)	a	
Liver, beef (12)		51

Liver, beef (12)	22·5
" " (12)	28
" " (12)	34
" " (19)	58·85
" " (19)	56·62
" " (12)	8·8
" " (19)	56·62–58·85
" calf (12)	48
" " (12)	48
" cat (12)	10
" " (12)	12
" " young (12)	6·9
" " (12)	10–12
" doe (venison) (12)	5·5
" dog (12)	11·2
" " (12)	10
" " (12)	10–12
" ox (12)	51
" pigeon (12)	3·5
" rabbit (12)	12
" " half-grown (12)	3·9
" " " (12)	2·8
" sheep (12)	18
" " (12)	18
" " (12)	6·4
" " (12)	33·6
" " (12)	18
" " fœtus (12)	7·5
Medlars (15)	2·8
Milk, cow (12)	1·6
" " (12)	·25
" " (12)	b
" " (12)	·027
" " (12)	·03
" " (12)	·003
Molasses, baking (19)	4·82
" " (19)	4·93
Must from sprayed grapes (1)	·7–2·6
" 1 kilogramme (3)	12·80
" 1 " (3)	11
" 1 " (3)	10·40
Mutton (11)	1
Oatmeal (19)	4·27
" (19)	4·51
Oats (25)	40–200
Olive oil (2)	b
Ox muscle (12)	1
" " (12)	1
Oysters, Portuguese (18)	294
" Whitstable (18)	181

Oysters, Dutch (18)		181
“ Plymouth (18)		303
“ Green Falmouth (9), per oyster		0·4–1·4
“ Marennes (9), per oyster		0·400
“ from near Swansea (9)		40
“ 1 kilogramme (4)		2,000
Pareira, aqueous extract (27)	a	
Peaches (15)		5
Pears (15)		4·2
Peas (25)		60–110
“ (15)		25
“ American (14)		13
Peas, French (7)		59·4
“ canned, per pound (14)		967
“ preserved (18)		99·9
“ American (14)		66·8
Pigeon, dressed (12)		2·8
“ “ (12)		1·05
“ “ (12)		1·38
Piquette, 1 liter (3)		·11
Polycarpæa spirostylis (24)	a	
Potatoes (5)		2·8
Preserves, green, 1 kilogramme (15)		26–76
“ fruits boiled in sugar, 1 kilogramme (15)		4–9
Quassia, aqueous extracts (27)	a	
Quercus macrocarpa, per kilogramme of dry matter (13)		500
Raisins, 1 kilogramme (3)		3·50
“ 1 “ (3)		3
“ 1 “ (3)		3
Raspberries (15)		4·2
Rye (25)		10–30
Syrup, New Orleans, No. 10 (19)		1·50
“ “ “ (19)		1·47
Spleen, calf (12)		3·2
“ hog (12)		7·2
Strawberries (15)		8
Tamarinds (28)	b	
Water, mineral spring, Gettysburg, copper bicarbonate, per gallon (16)		·03
“ carbon springs, Hampshire Co., W. Va., per gal. (16)	b	
“ Bagneres de Luchon (LaReim) (16)	b	
Wheat, summer, 1 kilogramme (25)		190–230
“ winter, 1 “ (25)		200–800
Wines, white, 1 liter (1)		1–1·3
Whisky (18)		4
Wine, red (1)		·1
“ 1 liter (3)		·25
“ 1 “ (3)		·23

[1] (a) Indicates high percentage of copper.

[2] (b) Indicates presence of copper (traces).

THE EFFECTS OF FOODS CONTAINING COPPER ON MAN.

Being without any other reliable data as to the physiological effects of copper on man, save as a medicine, we naturally turn to the foods containing copper for evidence as to the effects of copper on man. The question has been repeatedly discussed before the courts, particularly in England, and the studies of Lehmann and others in Germany have contributed materially to an elucidation of the problem.

It is probable that the copper naturally occurring in plants is in a condition different from that found in food products which have been artificially treated with copper. That is, in the former case the copper is in a labile condition and therefore more assimilable, while in the latter case the compounds formed by the combination of the copper with the proteids and chlorophyl are less soluble and the copper is extracted only in part by acids of the strength of the gastric juice. According to Tschirch and Brandel[1] the copper in these more or less insoluble compounds is but slightly toxic. "From experiments with copper proteid Filehne concluded that an amount equivalent to 0·500 gramme of copper per day would produce no notable result in an adult."[2]

"Contrary to the earlier teachings, recent observations tend to the view that there is no chronic copper poisoning comparable with that of lead. According to this view the long-continued ingestion of minute doses of copper by the stomach and the exposure to absorption in handling and working the metal, are not capable of producing systemic poisoning. This view is based largely upon the negative results obtained in feeding-experiments with man and the lower animals, and in the therapeutic use of copper salts."[2]

Galippe had all of the foods which were used in his family for fourteen months cooked in copper vessels, and reported that no trouble was experienced. Dr. Smith,[2] in discussing the use of copper utensils for cooking purposes, says: "It seems impossible that enough copper could be present in food which would be eaten at one time to produce serious acute poisoning as has been frequently supposed, especially as the presence of as much as ½ a gramme of copper in 1 kilogramme of liquid food would produce a marked metallic taste."

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[1] Quoted by Dr. Smith in Buck's "Handbook of Medical Sciences."

[2] Buck's "Handbook of Medical Sciences."

Pasteur[1] says: "In regard to the toxicity of copper salts, it may be said it is almost impossible to take a dose large enough to produce death, both from their horrible taste and from the violent vomiting which they produce. In small quantities the taste is not perceptible, and the salts are not only tolerated but absorbed. Workers in copper are often completely saturated with the metal, but do not suffer from it. Experiments on animal and human subjects have never given a worse result than vomiting or a temporary fit of colic. Copper normally exists in the human body. It gains entrance from various foods and drinks in the absence of all adulteration. It accumulates to a certain extent, but injury from this accumulation is unknown. In the samples submitted, copper exists to an extent varying between 16 and 45 milligrammes per kilogramme. . . . The quantity found does not constitute a danger to health."

CONCLUSIONS.

(1) It is pretty well established that the typhoid organism is disseminated not only through water, but also through air and food, and may retain its vitality for a considerable period of time.

(2) Typhoid organisms in water are eliminated by filtration, boiling and certain biochemical methods. Of the latter, the use of copper, as proposed by Moore and Kellerman, is probably the most efficient and at the same time most practicable.

(3) While exceedingly minute quantities of copper in solution are toxic to certain unicellular organisms, as bacteria, it is safe to assume that the higher plants and animals, including man, are unaffected by solutions containing the same or even larger amounts of copper.

(4) There being a number of factors which tend to eliminate copper from its solutions, it is hardly likely that there would be any copper in solution by the time the water from a reservoir reached the consumer if the treatment of the reservoir were in competent hands.

(5) Many plants contain relatively large quantities of copper, and when these are used as food some of the copper is taken up by the animal organism, but there are no records of any ill effects from copper so consumed.

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[1] *Ann. d'Hyg.*, publ. Par., 3d ser., v. 3, p. 204. Mars., 1880.

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PROGRESS IN PHARMACY.

A QUARTERLY REVIEW OF SOME OF THE MORE INTERESTING LITERATURE RELATING TO PHARMACY.

By M. I. Wilbert,
Apothecary at the German Hospital, Philadelphia.

The most evident signs of progress in the healing art are to be found in the general interest that is being manifested in all matters relating to the education of future physicians and of future pharmacists.

It is becoming more and more recognized that the safeguarding of human life and the preservation of the health of individual citi-

zens is, after all, a matter of considerable importance, and is not to be entrusted, haphazardly, to ignorant or irresponsible individuals or to charlatans and quacks.

That the part that is to be taken by future pharmacists, in this connection, is admittedly an important one is evidenced by the nature of the attempted, or enacted, legislation, and also by the trend and the tone of the discussions relating to the advanced standing and requirements of the future pharmacist.

Prerequisite Law in Pennsylvania.—This law, recently signed by Governor Pennypacker (see A. J. P., 1905, page 182), probably constitutes the most important piece of legislation, from a pharmaceutical point of view, that has been enacted since the passage of the first prerequisite law, in New York State, a little more than a year ago. The law itself, while not all that could or should be desired, certainly constitutes a step in the right direction, and will do much toward giving to pharmacists in this State the recognition they rightfully deserve as being possessed of duties and attainments apart from those as shopkeepers. On the other hand, this law also imposes on present-day pharmacists added obligations to justify the enactment of the law, and to warrant its being continued on the statute book of the Commonwealth.

The evident shortcomings of the Pennsylvania law are to be found in the fact that it does not include provisions for some tangible evidence of the necessary preliminary education, and does not define what is meant by "some reputable and properly chartered college of pharmacy." It is possible, of course, that these additional points may safely be left to the discretion of the members of the State Board of Pharmacy, but it would nevertheless be more satisfactory if they could be clearly defined, and, at some subsequent time, be embodied in the law itself.

Pharmaceutical Education in Great Britain is still attracting considerable attention, and is a favorite subject for discussion in pharmaceutical circles. At a recent dinner of past and present students of the School of Pharmacy of the Pharmaceutical Society of Great Britain, Mr. Walter Hills, the treasurer of the society, said that, with the increase in the number of universities willing to include a course in pharmacy, it was quite probable that the School of Pharmacy, so long and so well conducted by the Pharmaceutical Society, would not be able to continue. He himself thought it

very desirable that pharmaceutical students should receive their scientific training, particularly in subjects such as chemistry and botany, side by side with students for other professions. (*Phar. Jour.*, March, 1905, page 336.)

Council on Medical Education of the American Medical Association.—The first annual conference of this Council was held in Chicago, April 20, 1905, and was attended by representatives of State and Territorial boards of examiners, and also by representatives of the American and Southern Medical College Associations and the Government medical services.

The object of the Council is to bring together and to co-ordinate the different interests bearing on the education and regulation of prospective medical practitioners.

The reports of the different sub-committees, particularly the report of the Committees on Preliminary Education and on Medical Curriculum, were exhaustive and suggested an outline of requirements that, if adopted, will contribute very materially to elevate the standard and attainments of future medical men. (*Jour. Amer. Med. Assoc.*, May 6, 1905, p. 1470.)

The Council on Pharmacy and Chemistry of the American Medical Association.—This Council, the objects and aims of which have been discussed in this JOURNAL (A. J. P., 1905, p. 179), has been the subject of considerable comment in medical as well as pharmaceutical journals. Practically all of the journals that are not directly under the influence of proprietary houses of a questionable character have endorsed the objects of this Council. The *Apothecary* for April, in referring to the announcement of the Council on Pharmacy and Chemistry, says that "it is fraught with vital interest to both the medical and the pharmaceutical professions of this country, and is, we sincerely believe, the announcement of the beginning of a better order of things, when much that is unfair and dishonest and uncertain and unethical in the practices of druggist, physician and manufacturer will be cleared away."

Another interesting announcement in this same connection is the avowed intention of several manufacturers of so-called patent medicines to publish the formulæ of their preparations on each package. While this is probably done to meet the requirements that will probably be made in Venezuela, Cuba and in New Zealand, it also evidences the trend of the times, the abolition of secrecy, and is

simply a forerunner of the general adoption of the same practice by all manufacturers.

Proprietaries in Great Britain.—Peter MacEwan, F.C.S., pharmaceutical chemist, in an address before the Western Chemists' Association, London, on the question—Are British pharmacists decadent?—in speaking of the dispensing of to-day, enumerated an analysis of a total of 1,728 prescriptions from twenty-eight different sources. Of these, 178, or a trifle over 10 per cent., included proprietary remedies. The lowest average was 2 per cent. and the highest 74 per cent. The latter was, however, exceptional, and the majority of the contributors expressed their satisfaction at the fact that the proprietaries came out lower than they had expected.

The comments and opinions of some of these correspondents are not alone interesting, but also instructive. Mr. E. Saville Peck, of Cambridge, says: "There appear to be fewer proprietary articles than usual. I maintain that when a physician who has acquired and retained the art of prescribing can rely upon the ability and the conscientiousness of the pharmacist, he is generally inclined towards official preparations. I believe that one of the main factors in the development of the custom to order "branded drugs" has been the inefficiency of many pharmacists, or rather I should say chemists or pseudo-chemists."

Mr. Harold Wyatt, Liverpool, says: "The prescribing of special preparations, outside those of the Pharmacopœia, is an evil which I firmly believe is to be laid at the door of the pharmacist himself rather than at that of the medical man. Where the pharmacist is ready to assist the doctor with useful and practical suggestions in which his acquaintance with pharmacopœial drugs, galenicals and methods is evident, it will be invariably seen that the doctor is ready and even anxious to order official preparations instead of secret compounds of hypothetical value." (*Chem. and Drug.*, March, 1905, p. 437.)

Among the more interesting publications relating to pharmacy that have recently appeared, *the General Index to Vols. I to L of the Proceedings of the American Pharmaceutical Association* is by far the most interesting and most valuable. If, as has been frequently asserted, the knowing how or where to obtain information is a fair alternative for the actual possession of the information, then this volume should certainly occupy a prominent place with the usual books of reference on the shelves of the up-to-date apothecary.

The Immunity Unit for Standardizing Diphtheria Antitoxin is the title of Hygienic Laboratory Bulletin No. 21, April, 1905. This bulletin, by Dr. M. J. Rosenau, the director of the laboratory, describes the principles that are involved and the methods that are employed for obtaining the immunity unit for measuring the strength of diphtheria antitoxin.

The pamphlet contains a readily understood description of Ehrlich's side-chain theory of immunity, and for this reason alone should be carefully studied by all who are in any way interested in the production, sale or use of diphtheria antitoxin.

This bulletin also contains the official text of the description of anti-diphtheritic serum, to be included in the forthcoming edition of the United States Pharmacopœia. This description is interesting, as, in addition to indicating the general lines that will probably be followed in other descriptions, it constitutes practically the first official announcement that anti-diphtheritic serum is to be included among the official medicaments.

The United States Pharmacopœia, 1900.—According to a preliminary announcement in *Medical Book News* for April, the forthcoming edition of the Pharmacopœia will contain many changes and improvements. Assays have been introduced for alkaloidal drugs. The strengths of tinctures have been amended so as to reduce them practically to two classes—10 per cent. for the more powerful preparations and 20 per cent. for the others. Purity rubrics have been inserted, which will tend to define the limits of innocuous foreign substances. Many obsolete drugs and preparations have been omitted. Reliable new synthetics have been introduced, and also average doses for the first time in the history of pharmacopœial revision in America.

Morphine Centenary.—The one hundredth anniversary of the discovery of morphine by Sertürner was celebrated on March 20, 1905, by the unveiling of a memorial tablet on the "Hochzeitshaus" in Hameln, in which the "Raths Apotheke," at one time owned by Sertürner, was formerly located. The discovery of morphine itself was probably made in the Adler Apotheke, in Paderborn, where Sertürner had served as an apprentice, and where, at the time of his discovery, he was employed as an assistant.

Friedrich Wilhelm Adam Sertürner was born July 19, 1783, at Neuhaus, near Paderborn, where he was also educated. From 1799

to 1803 he served as apprentice in the Adler Apotheke at Paderborn, then owned by F. A. Cramer. Sertürner remained here until the spring of 1806, when he entered as an assistant in the Ratsapotheke at Einbeck. In the fall of 1809 he opened a second apotheke at Einbeck and it was here that he completed his study of morphine, in 1815–16. On the death of the proprietor of the Ratsapotheke in Hameln, in December, 1819, Sertürner became his successor and remained until his death, February 23, 1841.

A Canadian Compendium of Medicines.—A small pamphlet, containing formulas for preparations that are more or less extensively used by Canadian physicians, has been published under the auspices of the Ontario College of Pharmacy.

The object of publishing this compendium is highly commendable—the authorization and establishment of uniform and authoritative standards for medicinal articles required by both professions. The use of alternative formulas, British Imperial and Metric weights and measures, is to be deplored, as it detracts materially from conciseness and is likely to lead to misunderstandings and mistakes.

Administration of Antidiphtheritic Serum by Mouth.—A. M. Pilcher, while preparing to inject a patient with antidiphtheritic serum, broke his syringe and was in desperation induced to administer the intended dose by mouth. The prompt reaction that was obtained in this particular case induced him to repeat the experiment with like results. Pilcher thinks that the reaction is quite as prompt as by injection and much less objectionable. (*Apothek. Zeitg.*, 1905, page 156, from *Brit. Med. Jour.*)

The Sterilization of Water by Means of Nitro muriatic Acid.—A. K. Federoff has duplicated the experiments that have been made by other investigators and finds that 0·06 per cent. of nitro-muriatic acid reduces the number of micro-organisms in well-water from 3,957 to 277 colonies in twenty minutes. In another experiment they were reduced from 1,734 to 70 in thirty minutes and from 1,590 to 40 in forty-five minutes.

The action on typhoid bacilli was determined by inoculating water with bouillon cultures of typhoid bacilli. Federoff finds that, from the point of view of the bacteriologist, nitro-muriatic acid is a useful and efficient means for sterilizing water; whether or not it is objectionable from a hygienic point of view is to be determined. (*Chem. Zeitg. Rept.*, 1905, page 108.)

Comparative Toxicity of Phenol and Cresols.—Tollens has made a series of experiments on frogs, mice and cats to determine the toxicity of phenol and sodium phenate as compared to ortho, meta and para cresol. He finds that para cresol is more poisonous than phenol; that ortho cresol is about equal in its toxicity to phenol, and that meta cresol is less powerful than either of the others. (*Phar. Jour.*, March, 1905, page 405; from *Arch. f. exper. Pathol.*)

Urotropin, Helmitol and Neurotropin.—A. Nicolaier has made a series of experiments and finds that despite the fact that theoretically methylene-citric acid (Helmitol) and the methylene citric acid combinations with hexamethylenetetramine (Neurotropin), should liberate larger quantities of formaldehyde than hexamethylenetetramine, these preparations, when given to dogs or men, appeared to have the reverse of the expected action.

Hexamethylenetetramine is found to be the most active and the methylenecitric acid the least. (*Phar. Jour.*, 1905, page 405; from *Arch. f. Klin. Med.*)

The Relations between Natural and Synthetical Glycerophosphoric Acid.—Frederick B. Power and Frank Tutin have experimentally confirmed the observations of Carré, that at temperatures above 110° the interaction between phosphoric acid and glycerole results in the production of varying amounts of diester accompanying the monoester or glycerophosphoric acid. They do not agree with Willstätter and Düdeke that the natural and the synthetical glycerophosphoric acid are not identical, but believe that the latter authors have been misled by the accompanying contamination of the glycerophosphoric acid by the diester. (*Chem. and Drug.*, March, 1905, page 394.)

Guadeloupe Jaborandi.—Dr. G. Weigel has had an opportunity of examining a sample of Guadeloupe Jaborandi. The leaves are particularly noticeable for their size, some of them being as much as 20 centimetres long and 10 centimetres wide, the average leaf being 10 centimetres long and half as wide. As a chief characteristic of Guadeloupe Jaborandi, Weigel points out that the midrib on the under side of the leaf is particularly prominent. An assay of the sample showed it to contain but 0.353 per cent. of alkaloids. (*Phar. Centrh.*, 1905, page 146.)

Commercial Formaldehyde Solutions.—W. K. Schulz has examined

a number of samples of solution of formaldehyde, comparing them with the requirements of the new Russian Pharmacopœia. He finds that solutions having a neutral or only slightly acid reaction are not to be had and believes that 0·23 per cent. of formic acid is permissible. Schulz was not able to find a sample containing 40 per cent. of formaldehyde, and believes that 35 per cent. would be a more reasonable requirement. All of the samples examined by him contained an appreciable amount of ash, in several cases as much as 1·5 milligrammes in 1 c.c. of the solution. (*Chem. Zeitg. Rept.*, 1905, page 105.)

Lycopodium.—G. Weigel (*Phar. Centrh.*, 1905, page 208) refers to several of the constantly recurring adulterations of lycopodium, and asserts that pine pollen is, in some parts of Europe, a well-established substitute for lycopodium. It is known as Austrian or Hungarian lycopodium, and is gathered and sold in considerable quantities. In addition to its sale as a distinctive commercial article, it has been used quite extensively as an adulterant of true lycopodium. Starch and talcum are also mentioned as having been found as adulterants in lycopodium. Weigel also mentions another, to him, novel adulterant that appears to have many of the physical characteristics of true lycopodium. This substance has been more carefully studied by Dr. Van Italie, who has discovered this adulterant to be powdered amber, colored possibly with some coal-tar dye. The most satisfactory method for detecting this rather novel adulterant is by means of the microscope, which, owing to the want of structural detail in the powdered amber, readily differentiates between it and the characteristic shape and markings of the sporules of lycopodium.

A New Reaction for Sugar of Milk.—If a solution of 0·5 gramme of sugar of milk in 10 c.c. of water of ammonia is carefully heated to such a point that ammonia is vaporized without boiling, the solution will, in the course of fifteen or twenty minutes, become dark red. Solutions of different varieties of other sugars become yellow on heating with ammonia. (*Phar. Centrh.*, 1905, page 274.)

Maximal dose of adrenalin and analogous preparations of the suprarenal capsules has been established by B. Müller, who recommends that doses of 0·00009 should not be exceeded. This quantity may be increased to 0·00015 in cases where the patient is under the influence of an anæsthetic without producing untoward results. (*Zeits. d. All. Oest. Apoth. Ver.*, 1905, page 325.)

Eserine Oil Solutions.—Émil Wild suggests the use of eserine in olive oil as a desirable substitute for aqueous solutions. The advantage of the oil solution is to be found in the fact that they are active, sterile, perfectly stable and non-irritating. The writer uses physostigmine salicylate, dried at 100° C., and subsequently dissolved in olive oil at a somewhat higher temperature. (*Phar. Zeitg.*, 1905, page 208.)

Calomelol.—This is a white or grayish-white powder that is practically odorless as well as tasteless. In 50 parts of cold water it is soluble or rather miscible to a permanent opalescent mixture. Calomelol is also soluble in dilute solutions of sodium chloride, solution of albumen and in other similar solutions. It is insoluble in alcohol, ether or chloroform.

Calomelol is said to consist of 75 per cent. of mercurous chloride and 25 per cent. of soluble albuminoids. It is used externally as a dusting powder and also in form of an ointment. (*Apothek. Zeitg.*, 1905, page 227.)

Lentin.—This is said to be metaphenylendiamin hydrochlorate, and is recommended to be used in cases of acute dysentery. Dose, for adults, 0·1 to 0·3 gramme three times a day. (*Apothek. Zeitg.*, 1905, page 156.)

Neuronal.—This is diethyl brom acetamide, a white crystalline powder having a camphoraceous odor and a bitter, cooling taste. It melts at 66° to 67° C. Neuronal is soluble in about 120 parts of cold water, and is decomposed by boiling water; it is freely soluble in alcohol, ether and the fatty oils. Hot or boiling solutions of an alkali decompose neuronal with the formation of hydrocyanic acid as one of the products of decomposition.

This formation of hydrocyanic acid is said to take place, even at ordinary temperatures, and with dilute solutions of an alkali. (*Phar. Centrh.*, 1905, page 68.)

Perugen.—This is a trade name for a synthetic balsam of Peru made in Germany. Perugen is said to have the consistency of syrup, to be brownish red in color, and to have a specific gravity of 1·141. It is also said to have the agreeable characteristic odor of balsam of Peru, and to be soluble in all proportions in absolute alcohol and in chloroform, but not readily miscible with the fatty oils. Alcoholic solutions give an acid reaction with litmus paper. Perugen conforms very closely to the German Pharmacopœia requirements for balsam of Peru. (*Phar. Zeitg.*, 1905, page 307.)

Quinine Glycerophosphate occurs in well-defined crystalline needles. Carré finds that glycerophosphoric acid furnishes two salts of quinine—a basic and a neutral salt. The pure basic salt can be obtained by mixing alcoholic solutions in the proportion of 1 molecule of the glycerophosphoric acid and 2 molecules of quinine. Operating with absolute alcohol an anhydrous salt is obtained, while with 80 per cent. alcohol a hydrated salt results. The salt is precipitated from the alcohol by the addition of ether, and finally crystallized from warm alcohol. (*Chem. and Drug.*, September, 1904, page 466, from *Bull. Soc. Chem. de Paris.*)

Rexotan is a new astringent prepared by Aufrecht by the condensation of tannic acid and urea by means of formic aldehyde. It has the chemical formula $C_{10}H_{14}N_2O_{10}$. (*Chem. and Drug.*, September, 1904, page 546.)

Sodium Perborate, $NaBO_3$, may be made by dissolving 100 grammes of borax in 900 c.c. of water with the addition of 285 grammes of sodium hydrate. To this solution is added 1,350 c.c. of a purified solution of hydrogen dioxide. After about one hour in the cold, crystals of $NaBO_3$ begin to separate.

The dried perborate may be kept indefinitely without change, and contains 10·3 per cent. of available oxygen. At 17° C. water will dissolve 1·17 per cent. of the perborate, corresponding to a solution of 0·26 per cent. of hydrogen dioxide. The solution of perborate has an alkaline reaction, due probably to the partial decomposition of the $NaBO_3$ to hydrogen dioxide and sodium metaborate. (*Chem. Zeitg. Rept.*, 1905, page 99.)

Stovaine.—Dr. F. Zernik has submitted stovaine to an extensive critical study, and defines it as a tertiary amino alcohol, chemically the chlorhydrate of benzoyl ethyl dimethyl amino propanol. Stovaine is readily soluble in water, alcohol or acetic ether. It has been recommended as a substitute for cocaine, used in the same way and in about the same doses. (*Apoth. Zeitg.*, 1905, p. 174.)

Stovaine, Untoward Effect of.—Dr. D. A. Sinclair, at a meeting of the Clinical Society of the New York Polyclinic School and Hospital, reported the use of stovaine in four cases with very unsatisfactory results. In his hands it proved less efficacious, in anæsthetic effect, than cocaines, and gangrene followed its use in three of the patients. A 2 per cent. solution was used. (*The Drug Circ.*, 1905, p. 152)

Polychloral (*Polymerized Chloral*).—This substance is obtained by the action of dehydrating agents on chloral. Polychloral occurs in white crystalline tasteless masses, slightly soluble in cold water or in cold alcohol; readily soluble in hot water or in hot alcohol, forming with the former chloral hydrate, and with the latter chloral alcoholate. Heated gradually, polychloral is vaporized without melting. It melts at 153° to 155° C.

Polychloral has been suggested as an efficient hypnotic. It may be given in doses from 0·75 to 2·00 grammes three times a day.

Viferral is a trade name for a product chemically identical with polychloral, but made under a patented process, using pyridine as the dehydrating agent. (*Vier. Jahrs. f. Prak. Phar.*, 1905, p. 26.)

CORRESPONDENCE.

AMERICAN PHARMACEUTICAL ASSOCIATION.

Prof. Henry Kraemer, Editor American Journal of Pharmacy.

DEAR PROFESSOR KRAEMER:—It affords me pleasure to inform you that the Fifty Years' Index of the Proceedings is now ready for delivery, and on behalf of the officers and members of the American Pharmaceutical Association I beg to ask that you give the fact extended publicity in your valued JOURNAL, with the view of furthering the use of the book.

I am enclosing herewith a copy of the preface of the index for your guidance, and beg to add that all orders for the book should be addressed to this office.

Thanking you in advance for the favor,

Very truly yours,

CHAS. CASPARI, JR.

PREFACE TO THE FIFTY YEARS' INDEX OF THE PROCEEDINGS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

On the occasion of the fiftieth anniversary of the organization of the American Pharmaceutical Association in 1902, the preparation of a collective index of the first fifty volumes of Proceedings, 1851 to 1902, inclusive (none having been issued in 1861), was agreed upon. The manuscript of the Collective Index was prepared under the direction of the General Secretary and presented at the meeting held

at Mackinac Island in 1903. Its immediate publication was made possible by the kind assistance of the publishers of the *Druggists' Circular*, the *American Druggist*, the *Bulletin of Pharmacy*, *Merck's Report* and the *Pharmaceutical Era*, who generously offered to share equally the cost of production of a work thought to be desirable for the use of all interested in the progress of pharmacy and cognate sciences, the American Pharmaceutical Association agreeing to reimburse the publishers of the above-named journals from the sale of the book as the same progresses.

The index, which contains over 55,000 titles and nearly 70,000 references, has been arranged with a view to economy of time in searching for the names of authors or subjects, and in this respect differs materially from the indices issued in 1884 and 1891. The subject-matter has been printed in brevier type, and instead of roman numerals, large heavy figures have been used for the volume numbers, while the page numbers have been set in smaller light figures. The names of authors and deceased members appear in italics.

Unfortunately, while the work of publication was in progress, a large part of the manuscript and all the printed forms were destroyed in the disastrous fire which visited the city of Baltimore in February, 1904, and an unavoidable delay of nearly twelve months occurred in the issue of the book, although, the same being insured, no financial loss was sustained.

By vote of the Association the price of the Collective Index has been fixed at five ($5) dollars per volume, and it is hoped that the book as arranged will prove acceptable to all members, and be freely used by them and by all students interested in the work of the A. Ph. A. during the first fifty years of its existence.

THE COMMITTEE ON PUBLICATION.

February, 1905.

PHILADELPHIA COLLEGE OF PHARMACY.

THE EIGHTY-FOURTH ANNUAL COMMENCEMENT.

The eighty-fourth annual commencement of the Philadelphia College of Pharmacy was held in the American Academy of Music, Thursday evening, May 18th. After prayer by the Rev. John R. Davies, D.D., the degrees were conferred by the president of the College, Howard B. French.

The degree of Master in Pharmacy (Ph.M.) was conferred *honoris causa* upon Frank Xavier Moerk, Ph.G., and *in course* upon Charles Herbert La Wall, Ph.G.

The following are the names of those receiving the degree of Doctor in Pharmacy (P.D.), together with the subjects of their theses:

Name.	*Subject of Thesis.*	*State.*
Acuff, Raymond Albanus,	Epinephrin,	Pennsylvania.
Althouse, Joseph Landis,	Opium,	Pennsylvania.
Anspach, Irvin Milton,	Ergot,	Pennsylvania.
Baer, Clyde Kreider,	Aloes,	Pennsylvania.
Bauder, Walter Westbrook,	Uric Acid,	Pennsylvania.
Becker, Raymond Clyde,	Solution and its Theory,	Pennsylvania.
Beringer, George M., Jr.,	The Pharmacognosy and Pharmacy of Galega Officinalis,	New Jersey.
Boesser, Lewis Edmund,	Olive Oil and its Adulterations,	Pennsylvania.
Bonner, John Edward,	Unguentum Zinci Oxidi,	Pennsylvania.
Bonta, Clarence LaRue,	Advertising; or "A Made-to-Order Reputation,"	Indiana.
Bosch, Karl Leander,	Strophanthus,	Pennsylvania.
Bowersox, Benjamin F.,	Cascara Sagrada,	Pennsylvania.
Butler, Walter Taggart,	Granular Effervescent Salts,	Pennsylvania.
Buzby, William Dubois,	Suppositories,	New Jersey.
Carhart, Clarence Cathers,	Ergot,	Pennsylvania.
Cast, Frank William,	Dry Distillation of Wood,	New Jersey.
Cohen, Arthur,	Resin of Podophyllum,	Pennsylvania.
Cott, William Jasper,	Pharmacopœial Tinctures,	Pennsylvania.
Crawford, Dean Burton,	Solution of Hydrogen Dioxide,	New York.
Crothers, Howell Guy,	Chloral Hydrate,	Maryland.
Davidowitch, K. M. (Miss),	Olive Oil,	Pennsylvania.
Davies, George Bertram,	Eucalyptus Globulus,	Pennsylvania.
Diller, Charles Marclay,	Aloes,	Pennsylvania.
Dodds, William Howard,	Milk as a Food,	Kentucky.
Duncan, Chester A., P.C.,	Acetic Acid,	Pennsylvania.
Dundore, Harry Wilson,	Ptomaines,	Pennsylvania.
Eckhardt, Harry F.,	Wild Cherry,	California.
Ehrenfeld, William King,	Liquor Magnesii Citratis,	Pennsylvania.
Eisenhardt, Harry,	Cinchona,	Pennsylvania.
Elliot, Francis Theodore,	Estimation of Lime in Syrupus Calcis,	Pennsylvania.
Eves, Charles Palm,	Oleum Ricini,	Pennsylvania.
Fernandez, Juan Diego,	Snake Weed of Mexico,	Mexico.
Freeman, Leslie Steckle,	Coffee,	Pennsylvania.
Garton, Frank M.,	Pepsin and its Preparations,	Pennsylvania.
Gerhardt, John Isaac,	Glucose,	Pennsylvania.
Gilliland, Ray Dill,	Diphtheria Antitoxin,	Pennsylvania.

Name.	*Subject of Thesis.*	*State.*
Given, Horace Ware,	American-Grown Belladonna,	New Jersey.
Glenn, Joseph Anthony,	Nutgall,	New Jersey.
Glenn, William Andrew,	Belladonna,	Pennsylvania.
Goulden, Frank Ellwood,	Phosphorus,	Pennsylvania.
Gravell, Thomas Lawrence,	Eucalyptus,	Delaware.
Gross, John Henry,	Asbestos,	Pennsylvania.
Hain, Landis R.,	Drug Store Economy,	Pennsylvania.
Hampton, Powell,	Copaiba,	Pennsylvania.
Hand, Wilson Howe, P.C.,	The Bettendorf Test for Arsenic in Bismuth,	Oklahoma T.
Hassman, David Morris,	Borax and the Analysis of Commercial Samples,	Pennsylvania.
Hathaway, Edwin Cowee,	Methyl Alcohol,	Massachusetts.
Hausmann, Lewis H., Jr.,	Picraena Excelsa,	Pennsylvania.
Hodge, Mary M. (Miss),	Camphor,	Pennsylvania.
Hohmeier, Frank,	Vaccine Virus,	New Jersey.
Holroyd, Eugene Mark,	Cocainæ Hydrochloras,	Illinois.
Holzschuh, Frank H.,	Liquid Air a Preservative,	Pennsylvania.
Houk, Joseph Howard,	Unguentum Aquæ Rosæ,	Pennsylvania.
Hughes, Leonard,	Suppositories,	Pennsylvania.
Hunt, Robert Joseph,	The Drug Clerk,	Nebraska.
Joerg, Walter Hamilton,	Scaled Salts of Iron,	Pennsylvania.
Johnson, Charles Herbert,	Alcohol,	New Jersey.
Karns, Harry Clifford,	Substitution and Adulteration,	Pennsylvania.
Kennedy, William,	Antitoxin Vaccine,	Pennsylvania.
Kern, Samuel Benjamin,	Strophanthus,	Pennsylvania.
Krause, John Phaon,	Practical Education in Pharmacy,	Pennsylvania.
Kurtzman, LeRoy William,	Commercial Malt Extract,	Pennsylvania.
Lehman, John Christopher,	Immunity,	Pennsylvania.
LeNoir, Philip M. Hutchins,	Curare,	New Jersey.
Littlefield, Eugene Ricker,	Milk,	Maine.
McEntire, Harry D.,	Thermometers,	Pennsylvania.
McLaughlin, Charles H.,	Retail Pharmacy Commodities,	Pennsylvania.
McNess, Frederick Wm.,	Ferrum Reductum,	Ohio.
Maier, Charles,	Gossypium Purificatum,	New Jersey.
March, Gilbert,	Sinapis,	Pennsylvania.
Mathis, Wilbert,	Pepsinum,	New Jersey.
Miller, George Washington,	The Aniline Dyes,	Pennsylvania.
Mohler, Edwin Royer,	Benzoinum,	Pennsylvania.
Nevins, George Lohman,	Cascara Sagrada,	Pennsylvania.
Newcomb, Edwin Leigh,	Specimen Case : Herbarium : Purification of Water,	New Jersey.
Newcomer, Samuel Snyder,	Honey,	Pennsylvania.
Oellig, John Bayer,	Extractum Sennæ Fluidum,	Pennsylvania.
Ottmann, Richard Henry,	Uva Ursi,	South Dakota.
Owens, David,	Gentiana,	Pennsylvania.
Palmer, Lloyd Preston,	Formaldehyde in Witch Hazel,	Georgia.
Phillips, William J.,	Soluble Tar,	Pennsylvania.

Name.	*Subject of Thesis.*	*State.*
Plum, Harry Freeman,	Cod Liver Oil,	Ohio.
Reahard, Ralph McDonnell,	Tincture of Iodine,	Ohio.
Remington, Joseph Percy,	Iodoform,	Pennsylvania.
Renfrew, Clarence Hull,	Acacia,	Pennsylvania.
Retzer, George Henry,	Tannin,	Washington.
Rhoads, Wilmer Beaver,	Acidum Salicylicum,	Pennsylvania.
Richards, Hervey Taylor,	Cerium Oxalate,	Pennsylvania.
Rippetoe, John Ross,	The Purification of Water for Pharmaceutical and Other Purposes,	Virginia.
Roan, Patrick Aloysius,	Aloes,	Pennsylvania.
Saurman, John Shelley,	Abstracts,	Massachusetts.
Schimpf, Frederick Wm.,	Methyl Alcohol,	Pennsylvania.
Schlitzer, Henry Joseph,	Opium,	Pennsylvania.
Schmidt, Carl Emil,	Ceratum Resinæ Compositum,	Ohio.
Schrader, George Ralph,	Kaolin,	Pennsylvania.
Scott, Walter Edward,	U.S.P. Preparations of Opium,	Pennsylvania.
Shiffer, Samuel Arthur,	Strophanthus,	Pennsylvania.
Shugars, William Styres,	Syrup of Hydriodic Acid,	Pennsylvania.
Sibila, Clement Jerome,	Lemon Syrup,	Ohio.
Slifer, Hannah W. (Miss),	Iron,	Pennsylvania.
Smith, Jay Fisk,	Casein and Some of its Uses,	Arkansas.
Smith, Stanley Gloninger,	Adulterations of Spiritus Frumenti,	Pennsylvania.
Snyder, Frederick Maurice,	Cola (Kola)	Pennsylvania.
Sollenberger, Maude (Miss),	A Polariscopic Study of Reserve Starch Grains,	Pennsylvania.
Spalding, Andrew Eaton,	Acidum Salicylicum,	Pennsylvania.
States, Franklin Pierce, Jr.,	Gossypium,	Pennsylvania.
Stevenson, Nellie J. (Miss),	Strophanthus,	Pennsylvania.
Sweeney, John Edward,	Acacia,	Pennsylvania.
Sylvester, Howard George,	Acidum Tannicum,	Pennsylvania.
Van Antwerp, James C.,	An Inferior Grade of White Mustard,	Alabama.
Wade, Joseph Louis,	Incompatibilities of Ichthyol,	Pennsylvania.
Warnick, Canby Paul,	Liquor Plumbi Subacetatis,	Pennsylvania.
Weiser, Clinton Robert,	Nux Vomica and its Alkaloids,	Pennsylvania.
Welch, Louis J. F.,	Ulmus,	Pennsylvania.
Whitney, Harry Nason,	Cinchona and its Alkaloids,	Maine.
Wipf, Eugene James,	Wood Alcohol,	Pennsylvania.
Witmer, Paul DeLancey,	The Differentiation of Datura Stramonium, Hyoscyamus Niger and Atropa Belladonna,	Pennsylvania.
Woodland, Edward Elias,	Mezquite Gum,	Texas.
Yeakel, Nelson Lewis,	Zizania Aquatica,	Pennsylvania.

The following are the names of those receiving the degree of Pharmaceutical Chemist (P.C.), together with the subjects of their theses:

Name.	*Subject of Thesis.*	*State.*
Bardwell, Seth Arden,	Kola,	Ohio.
Fekula, Joseph Harry,	Drug Abuses,	Pennsylvania.
Kahnweiler, Bertram,	Design of a Prescription Department,	Montana.
Sweeney, John Francis,	Antitoxin,	New Jersey.

The following members of the class were awarded the certificate of Proficiency in Chemistry:

Name.	*State.*
Chisholm, Jesse Connor, P.D.	Texas.
Eckman, Joshua Evans	Pennsylvania.
French, Charles Dunning	Pennsylvania.

There were one hundred and twenty-six members of the graduating class, coming from the various States and Mexico, as follows: Alabama, 1; Arkansas, 1; California, 1; Delaware, 1; Georgia, 1; Illinois, 1; Indiana, 1; Kentucky, 1; Maine, 2; Maryland, 1; Massachusetts, 2; Mexico, 1; Montana, 1; Nebraska, 1; New Jersey, 12; New York, 1; Ohio, 6; Oklahoma, 1; Pennsylvania, 85; South Dakota, 1; Texas, 2; Virginia, 1; and Washington, 1.

Prof. Joseph P. Remington, Dean of the Faculty, announced that beginning with January 1, 1906, no one will be permitted to come up before the Pennsylvania State Board of Pharmacy for examination as a licensed pharmacist unless he or she is a graduate of some reputable and properly chartered college of pharmacy. (See this JOURNAL, p. 182).

Hon. A. K. McClure made the valedictory address.

AWARD OF PRIZES.

The dean announced that the following members of the class received the grade of distinguished: George Mahlon Beringer, Jr., Frederick William McNess, Lloyd Preston Palmer, and Ralph McDonnell Reahard; and the following that of meritorious: Irvin Milton Anspach, Joseph Harry Fekula, George Washington Miller, Edwin Royer Mohler, Richard Henry Ottmann, Joseph Percy Remington, John Ross Rippetoe, John Shelley Saurman, Maude Sollenberger, Nellie Jane Stevenson and Edward Elias Woodland.

THE PROCTER PRIZE, a gold medal and certificate, for the highest general average of the class, with a meritorious thesis, was awarded to Lloyd Preston Palmer, President French making the presentation.

THE WILLIAM B. WEBB MEMORIAL PRIZE, a gold medal and certificate, offered for the highest general average in the branches of committee, operative pharmacy and specimens, was awarded to John

Shelley Saurman, the presentation being made by the treasurer of the College, James T. Shinn. The following graduates received honorable mention in connection therewith: Joseph Harry Fekula, Harry Clifford Karns, Richard Henry Ottmann, Lloyd Preston Palmer, Maude Sollenberger and Joseph Louis Wade.

The Chemistry Prize of $25, offered by Prof. Samuel P. Sadtler, for knowledge of chemical quantitative analysis, was awarded to Joseph Percy Remington. The following graduates received honorable mention in connection therewith: Frederick William McNess and Ralph McDonnell Reahard.

The Pharmacognosy Prize, a Zentmayer microscope, offered by Prof. Henry Kraemer, for original research in pharmacognosy, was awarded to John Ross Rippetoe. The following graduates received honorable mention in connection therewith: George Mahlon Beringer, Jr., Juan Diego Fernandez, Edwin Leigh Newcomb, Richard Henry Ottmann, Clement Jerome Sibila, James Callanan Van Antwerp and Edward Elias Woodland.

The Materia Medica Prize, $25, offered by Prof. Clement B. Lowe, for the best examination in materia medica and in the recognition of materia medica specimens, with a meritorious thesis, was awarded to Joseph Percy Remington. The following graduates received honorable mention in connection therewith: Irvin Milton Anspach, George Mahlon Beringer, Jr., Edwin Leigh Newcomb, John Ross Rippetoe, James Callanan Van Antwerp and Edward Elias Woodland.

The Analtyical Chemistry Prize, $25, offered by Prof. Frank X. Moerk, for the best work in qualitative and quantitative analysis, was awarded to Ralph McDonnell Reahard. The following graduates received honorable mention in connection therewith: Irvin Milton Anspach, George Mahlon Beringer, Jr., Frederick William McNess, George Washington Miller, Lloyd Preston Palmer and John Ross Rippetoe.

The Operative Pharmacy Prize, $20 in gold, offered by Prof. Joseph P. Remington, for the best examination in operative pharmacy, was awarded to Maude Sollenberger. The following graduates deserved honorable mention in connection therewith: Charles Marclay Diller, Harry Freeman Eckhardt, Harry Clifford Karns, John Phaon Krause, John Christopher Lehman, Harry Lawrence McEntire, Charles Henry McLaughlin, Richard Henry Ottmann,

Lloyd Preston Palmer, Ralph McDonnell Reahard, John Shelley Saurman, Samuel Arthur Shiffer, William Styres Shugars, Clement Jerome Sibila and Joseph Louis Wade.

THE MAISCH PRIZE, $20 in gold, offered by Mr. Jacob H. Redsecker, of Lebanon, Pa., for histological knowledge of drugs, was awarded to John Ross Rippetoe, the presentation being made by Professor Kraemer. The following graduates deserved honorable mention in connection therewith: Irvin Milton Anspach, George Mahlon Beringer, Jr., Juan Diego Fernandez, Horace Ware Given, George Washington Miller, Richard Henry Ottmann, Joseph Percy Remington, John Shelley Saurman, William Styres Shugars, Clement Jerome Sibila and Edward Elias Woodland.

THE THEORETICAL PHARMACY PRIZE, a Troemner agate prescription balance, offered by Mr. Mahlon N. Kline, for the best examination in theory and practice of pharmacy, was awarded to George Mahlon Beringer, Jr. The following graduates deserved honorable mention in connection therewith: Frederick William McNess, Lloyd Preston Palmer, Ralph McDonnell Reahard and Edward Elias Woodland.

THE COMMERCIAL TRAINING PRIZE, $20 in gold, offered by Prof. Joseph P. Remington, to the graduate who passed the best examination in commercial training at the final examination for the degree, was awarded to Clarence LaRue Bonta, the presentation being made by Dr. Adolph W. Miller. The following graduates deserved honorable mention in connection therewith: Irvin Milton Anspach, George Mahlon Beringer, Jr., Frank William Cast, Katie Minerva Davidowitch, Francis Theodore Elliot, Frank Morton Garton, John Henry Gross, Powell Hampton, Frank Herman Holzschuh, Charles Herbert Johnson, Bertram Kahnweiler, Frederick William McNess, Charles Maier, George Washington Miller, Edwin Royer Mohler, George Lohman Nevins, Edwin Leigh Newcomb, Lloyd Preston Palmer, Ralph McDonnell Reahard, Joseph Percy Remington, John Ross Rippetoe, Patrick Aloysius Roan, Samuel Arthur Shiffer, Stanley Gloninger Smith, Frederick Maurice Snyder, Maude Sollenberger, Franklin Pierce States, Jr., Nellie Jane Stevenson, James Callanan Van Antwerp, Clinton Robert Weiser and Edward Elias Woodland.

THE INSTRUCTORS' PRIZE, $20, offered by the Instructors of the College, for the highest term average in the branches of pharmacy, chemistry and materia medica, was awarded to George Mahlon

Beringer, Jr., the presentation being made by Freeman P. Stroup. The following graduates deserved honorable mention in connection therewith: Frederick William McNess and Lloyd Preston Palmer.

The Pharmacy Quiz Prize, one year's membership in the American Pharmaceutical Association, offered by Charles H. LaWall, for the best term work in theory and practice of pharmacy, was awarded to George Mahlon Beringer, Jr. The following graduates deserved honorable mention in connection therewith: Frederick William McNess, George Washington Miller and Edward Elias Woodland.

The Kappa Psi Fraternity Prize, $20 in gold, offered by the Eta Chapter of the Kappa Psi Fraternity to the graduate making the highest general average during the three years' course at the College, was awarded to Lloyd Preston Palmer, the presentation being made by Professor Sadtler. The following graduates deserved honorable mention in connection therewith: Irvin Milton Anspach, George Mahlon Beringer, Jr., Frederick William McNess, Ralph McDonnell Reahard and James Shelley Saurman.

COMPLIMENTARY SUPPER GIVEN BY THE FACULTY.

On Wednesday evening, May 17th, a complimentary supper was tendered the graduating class by the members of the Faculty. The supper was given in the Museum of the College, and among the invited guests were some of the officers and members of the College. Professor Remington acted as toastmaster, and short speeches were made by members of the Faculty, the Instructors, officers of the College, and by a number of the graduating class.

BACCALAUREATE SERMON.

Baccalaureate services were held in the Church of St. Luke and the Epiphany, the sermon being delivered by the rector, the Rev. David M. Steele.

ALUMNI ASSOCIATION.

The annual reunion and banquet of the Alumni Association was held at the Lulu Temple on Tuesday evening, May 16th. There was a large number of members in attendance, and remarks were made by representatives of the several classes dating back to 1854.

The forty-first annual meeting of the Alumni Association was held in Alumni Hall, Monday afternoon, May 15th, at 2.30 P.M., with the President, Walter A. Rumsey, in the chair. After the annual address of the President, reports from the other officers and standing committees were received. The annual election was then held, and resulted in the choice of the following officers: President, Freeman P. Stroup; Vice-Presidents, John D. Burg and Charles H. LaWall; Recording Secretary, Joseph W. England; Corresponding Secretary, E. Fullerton Cook; Treasurer, C. Carroll Meyer; Board of Directors, for three years, Jacob M. Baer, William H. Gano, David J. Reese and William E. Ridenour.

The annual reception given by the association to the members of the graduating class was held the evening of the same day, in the College Museum, with President Rumsey in the chair. After the roll call of new members elected during 1904–05, an address was made by Dr. Henry Beates, Jr., President of the Pennsylvania State Board of Medical Examiners.

The prizes offered by the association were awarded as follows:

THE ALUMNI GOLD MEDAL for the best general average for the year was awarded to Lloyd Preston Palmer, and presented by Freeman P. Stroup.

THE ALUMNI PRIZE CERTIFICATES, offered for the highest general average in Pharmacy, Chemistry, Materia Medica, Committee, Operative Pharmacy, Analytical Chemistry and Specimens were respectively awarded as follows, Mahlon N. Kline, chairman of the Board of Trustees, making the presentation: George Mahlon Beringer, Jr., Richard Henry Ottmann, Joseph Percy Remington, George Mahlon Beringer, Jr., Miss Maude Sollenberger, Irvin Milton Anspach and Lloyd Preston Palmer.

THE ALUMNI SILVER MEDAL was awarded to Miss Nino Berta Whaland for the best general average in the second year examination, John D. Burg making the presentation.

THE ALUMNI BRONZE MEDAL was awarded to Eli Lilly for the best general average in the first year examination, and was presented by Charles H. LaWall.

The Class Oration was delivered by Clarence LaRue Bonta; the Class Poem by Clement Jerome Sibila; the Class History by Edwin Royer Mohler; and the Horoscope of the Class by William J. Phillips.

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JULY, 1905.

A COMPARATIVE STUDY OF VARIOUS FRUIT AND VEGETABLE COLORS.[1]

By Charles H. LaWall, Ph.M.

A comparative study of various coloring materials is desirable at the present time on account of the frequency with which questions arise concerning the authenticity of given samples of fruit syrups and fruit juices, and in consequence of legislative attempts which have recently been made to legalize the use of certain harmless colors of vegetable origin where conditions arise in which the original fruit colors are not permanent.

There is no intention whatever to discuss the physiological effect of the vegetable colors as contrasted with the so-called coal-tar or aniline colors (which might be more appropriately referred to as the synthetic colors).

There is no doubt that the synthetic colors as made at the present time are free from the dangerous metallic impurities, such as arsenic, which were formerly associated with these colors on account of the then existing methods of manufacture; and at the present time the feeling against the coal-tar colors seems to be based upon theoretical grounds due to their pronounced tinctorial affinity for animal tissues, rather than upon any observations of the ill effects following the administration of such colors as a class.

Many specific laws have been passed in various European countries regulating the use of coloring matters in foodstuffs, and in some cases attempts have been made to legalize the use of certain colors, which have been proved to be harmless, regardless of their origin.

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[1]A thesis presented to the Philadelphia College of Pharmacy for the degree of Master in Pharmacy, Ph.M., *in course*, May, 1905.

The list compiled by the National Confectioners' Association of the United States includes several hundred colors of animal, vegetable, mineral and synthetic origin, and is largely based upon the investigations of Weyl and Koenig and the lists of permitted colors published in Switzerland and in France.

The recent legislative attempts in Pennsylvania to limit the use of added colors to a comparatively small list of well-known vegetable colors seems to call for some special investigation in this direction, particularly as the work which has previously been done in this connection by investigators, such as Robin and Leeds, has not included all of the vegetable and fruit colors which are available and of practical use, while, on the other hand, the tabulated investigations of the coal-tar colors are both numerous and complete, as may be seen by referring to the work of such authorities as Witt, Weingartner and Rota, the scheme of the latter authority being probably the best known and the most widely used at the present time.

The authenticity of the samples which are employed in making the observations in work of this kind is of the highest importance, and in the work upon this subject which is here presented, the identity of every sample which has been used has been assured by personal investigation and by the use of only such canned or preserved fruits or fruit-wines as have been prepared in the author's own family under perfectly normal conditions, using no added material except sugar.

The blackberry color was first obtained by using a specimen of blackberry wine, and was afterward verified from a sample of preserved blackberries.

The black and red cherry colors were both obtained from the canned fruit.

The cranberry color was prepared from the fresh fruit.

The currant color was obtained from the wine, and was afterward verified by using the jelly.

The elderberry color was first obtained from the jelly, and was subsequently verified by using the wine.

The grape color was obtained both from the jelly and the unfermented juice.

The huckleberry color was obtained from the canned fruit.

The plum color was obtained from the preserved fruit.

The raspberry color was obtained from the wine, and was verified by using the preserved fruit.

The strawberry color was obtained from the fresh fruit, and was verified from the preserved fruit.

The beet juice was prepared from the fresh vegetable.

Such dyestuffs and drugs as are commonly used as sources of color, and which were deemed worthy of consideration in this connection, were obtained in the unground or whole condition, through the kindness of Mr. F. P. Sher, of Smith, Kline & French Company, and were prepared for use by the author himself.

In considering the best and most effective method of making a comparison of so many different colors it was deemed advisable to reduce all of the solutions to a uniform color density, rather than to base the comparisons upon the solutions made up to a certain uniform weight in volume strength, owing to the very great differences existing in the tinctorial power of the various fruits and dyestuffs when prepared in the form of aqueous infusions or decoctions, as was done in the present work.

The solutions were prepared as follows: In the cases of fruits where jellies or canned fruits or fruit preserves were used, the pulpy material was separated by straining and the liquid reduced to a given color density by dilution with water and comparison with an arbitrary standard which had previously been prepared for this purpose.

Such drugs as logwood, safflower, saffron, etc., were prepared by making a decoction and digesting it at 100° C. until the coloring matter of the drug appeared to have been thoroughly extracted, then filtering and diluting to the standard color density as before.

A few examples of coal tar or synthetic colors (four in all), taken from samples of materials found to be in actual use by manufacturers in simulating fruit colors, are also included for better comparison.

The liquids having been thus prepared the first comparison was made by observing the color of 5 c.c. of the original liquid, contained in a 5 inch, $\frac{5}{8}$ inch test tube, provided with a foot, and then noting the change which was produced by the addition of 0·5 c.c. of 31·9 per cent. hydrochloric acid to one sample, and 0·5 c.c. of 10 per cent. ammonium hydroxide solution to another sample of the same quantity each contained in a similar test tube.

The tubes were placed side by side upon a sheet of white paper and observations noted of any change in color resulting from the addition of either the acid or the alkali or both.

This series of comparisons resulted as follows:

Fruit Colors.	Original Color.	Hydrochloric Acid.	Ammonia Water.
Blackberry	deep red	bright red	olive green
Cherry (black)	bright red	no change	bright green
Cherry (red)	purple	bright red	bright green
Cranberry	bright red	no change	olive green
Currant	bright red	no change	olive green
Elderberry	purple	bright red	bright green
Grape	purplish red	bright red	bright green
Huckleberry	deep red	no change	deep green
Plum	bright red	no change	bright green
Raspberry	bright red	no change	olive green
Strawberry	bright red	no change	deep red

Other Vegetable Colors.	Original Color.	Hydrochloric Acid.	Ammonia Water.
Annatto	orange red	deep red	no change
Beet Juice	red	no change	olive green
Brazilwood	orange red	slightly lighter	rose purple
*Cochineal	deep red	bright red	purple
Cudbear	deep red	no change	purple
Fustic	yellow	light yellow	dark yellow
Litmus	blue	red	no change
Logwood	purplish red	yellowish red	purple
Madder	red	light red	deep red
Marigold	yellow	no change	slightly darker
Red Saunders	light red	no change	olive green
Safflower	bright yellow	no change	deep yellow
Saffron	bright yellow	no change	no change
Turmeric	canary yellow	no change	reddish brown
Commercial Coal Tar Colors.			
One	bright red	deep red	deep red
Two	deep red	no change	no change
Three	bright red	no change	no change
Four	reddish yellow	no change	deep yellow

*Cochineal is classed with the vegetable colors in these tables.

In observing the changés recorded in the above table it will at once be noticed that with the single exception of strawberry, all of the fruit colors change to either olive green or bright green upon the addition of the ammonium hydroxide solution ; and, that with the exception of beet juice and red saunders, none of the other vegetable reds showed this distinctive change, the characteristic change of the other vegetable red colors being mainly to purple or blue upon the addition of the alkali. It will also be seen that in the instances of the synthetic colors, none showed either of these marked changes upon the addition of the alkali, nor have any other coal-tar colors which are in common use been observed by the author in which any marked change occurs upon the addition of ammonium hydroxide solution.

The chief point of difference between the synthetic colors and the natural vegetable colors is found in the fact that the synthetic colors may be deposited upon fat-free woolen goods, by a test known as the dyeing test, without the use of a mordant, while the vegetable colors with one or two marked exceptions will not be so deposited unless a mordant be previously used upon the fabric.

While this distinctive difference is so sharply marked as to make the recognition of the presence of a synthetic color a very easy task, there are certain characteristic effects observable even when the vegetable colors are employed in this test, consequently a comparison in this respect was considered to be of great importance.

The dyeing test was performed by adding 5 c.c. of 10 per cent. hydrochloric acid solution to 100 c.c. of the liquid prepared as in the first comparison, then immersing a piece of fat-free nun's veiling, 1 x 4 inches, and heating at 100° C. for one hour. The wool was then removed and washed thoroughly in plain water and dried.

In cases where an appreciable amount of coloring matter was deposited upon the wool by the first dyeing, a second dyeing test was performed by immersing the piece of dyed wool in a dilute solution of ammonium hydroxide to dissolve the deposited color, removing the piece of wool after the color had been extracted from it, acidulating the liquid slightly with 10 per cent. hydrochloric acid solution, inserting a fresh piece of fat-free wool and again dyeing for one hour at 100° C.

The following table shows the results of this test when applied to the various colors which have been selected for examination and comparison:

RESULTS OF EXPERIMENTS WITH DYEING TEST.

Blackberry.—Dyes wool a dull pink on first dyeing, color changes to green upon applying ammonia. No second dyeing can be obtained.

Cherry (black).—Same as blackberry.

Cherry (red).—Dyes wool a very light pink on first dyeing, color changes to green upon applying ammonia. No second dyeing can be obtained.

Cranberry.—No appreciable color on first dyeing.

Currant.—Same as cherry (red).

Elderberry.—Same as cherry (red).

Grape.—Same as blackberry.

Huckleberry.—Same as blackberry.

Plum.—Same as cherry (red).

Raspberry.—No appreciable color on first dyeing.

Strawberry.—Dyes wool very faint pink on first dyeing. Ammonia produces no change. No second dyeing can be obtained.

Annatto.—Dyes wool yellow in first dyeing. Ammonia produces no change. Second dyeing very much lighter.

Beet Juice.—No appreciable color on first dyeing.

Brazilwood.—Dyes wool yellow on first dyeing. Ammonia changes to rose purple. Second dyeing very faintly yellow.

Cochineal.—Dyes wool bright red on first dyeing. Ammonia changes to deep purple. Second dyeing very light pink.

Cudbear.—Dyes wool dull red on first dyeing. Ammonia changes to deep purple. Second dyeing slightly lighter than the first.

Fustic.—Dyes wool dirty yellow on first dyeing. Ammonia changes to brown. Second dyeing very light yellow.

Litmus.—Dyes wool light pink on first dyeing. Ammonia changes to bright blue. Second dyeing very faintly pink.

Logwood.—Dyes wool dirty yellow on first dyeing. Ammonia changes to deep purple. Second dyeing very much lighter.

Madder.—Dyes wool orange yellow on first dyeing. Ammonia changes to red. Second dyeing very much lighter.

Marigold.—Dyes wool pale yellow on first dyeing. Ammonia produces no change. Second dyeing little or no color.

Red Saunders.—Dyes wool a dirty pink on first dyeing. Ammonia changes to greenish. Second dyeing little or no color.

Safflower.—Dyes wool bright yellow on first dyeing. Ammonia changes to brown. Second dyeing very much lighter.

Saffron.—Dyes wool bright yellow on first dyeing. Ammonia produces no change. Second dyeing very much lighter.

Turmeric.—Dyes wool bright yellow on first dyeing. Ammonia changes to reddish brown. Second dyeing very much lighter.

Coal Tar Color (1).—Dyes wool bright red on first dyeing. Ammonia produces no change. Second dyeing practically the same as the first.

Coal Tar Color (2).—Same as (1).

Coal Tar Color (3).—Same as (1).

Coal Tar Color (4).—Dyes wool orange yellow on first dyeing. No change produced by ammonia. Second dyeing as bright as the first. HCl produces deep red color on dyed wool.

It will be seen upon looking over the foregoing results, that in none of the cases of pure fruit colors could results be obtained by a second dyeing test, and in most cases but a faint pink color, usually a dirty or muddy pink, was obtained in the first dyeing. The application of ammonium hydroxide solution to the wool faintly colored by the pure fruits produced a faint greenish tint in every case but that of strawberry, where no change was observable.

The other vegetable colors were not uniform in this respect. Some of them dyed the wool a pronounced characteristic shade on the first dyeing, but with the exception of cudbear none of them produced any appreciable results upon the second dyeing.

In all of these cases the application of ammonium hydroxide solution to the reddened wool produced a characteristic change to purple, which affords a certain means of distinguishing these colors from the coal-tar colors with which they might be confused.

The yellow colors, such as safflower, saffron, turmeric, etc., exhibited no uniformity whatever. It will be observed that Brazilwood dyes wool a faint yellow shade upon the first dyeing, which might be mistaken for one of the other vegetable yellows, but the application of the ammonium hydroxide solution to the Brazilwood dyed piece of wool produces a characteristic change to rose-purple, while in the other cases there is either no change at all, or, at most, a slight darkening.

The synthetic colors will be observed to have dyed with as much intensity upon the second dyeing as upon the first, and no change

was produced upon the addition of ammonium hydroxide solution to the dyed wool.

These differences, when carefully studied, will be found to afford a means of differentiating many of the vegetable colors and of absolutely proving the presence of synthetic colors.

Fuller's earth, kaolin and kindred earthy materials have been observed to have the property of removing certain colors from their aqueous solutions, and one of the tests for the presence of caramel is based upon this color-absorbing property of fuller's earth.

A sample of kaolin was obtained which gave excellent results when used in the caramel test, and a test was made upon each of the color solutions and the effect noted.

Twenty-five cubic centimeters of the color solution were agitated for five minutes with 10 grammes of the kaolin, the mixture was poured upon a dry plaited filter and the filtrate collected in a dry Nessler's tube. The color of this filtrate was then compared with the color of an equal bulk of the original liquid contained in a similar tube.

These results were as follows:

KAOLIN TEST.

Fruit Colors.	Effect Produced.
Blackberry	slightly lighter
Cherry (black)	" "
Cherry (red)	" "
Cranberry	decolorizes
Currant	"
Elderberry	slightly lighter
Grape	decolorizes
Huckleberry	no change
Plum	decolorizes
Raspberry	slightly lighter
Strawberry	decolorizes

KAOLIN TEST.

Other Vegetable Colors.	Effect Produced.
Annatto	decolorizes
Beet Juice	no change
Brazilwood	slightly lighter
Cochineal	no change
Cudbear	much lighter
Fustic	much lighter
Litmus	decolorizes

Logwood	much lighter
Madder	much lighter
Marigold	slightly lighter
Red Saunders	decolorizes
Safflower	no change
Saffron	slightly lighter
Turmeric	decolorizes
Commercial Coal Tar Colors.	
One	no change
Two	no change
Three	no change
Four	no change

While no uniformity can be observed in the decolorizing or modifying effect of the kaolin upon the vegetable colors as a group, it will be seen that an additional factor is afforded for the differentiation and identification of some of the vegetable and fruit colors.

For instance, if beet juice had been added to strawberry syrup the color would not be entirely removed by filtration through kaolin and the addition of ammonium hydroxide solution to this filtrate would produce a greenish color, while, if only the natural color of the strawberry were present, complete decolorization would occur.

The reducing effect of nascent hydrogen produced by the action of hydrochloric acid upon metallic zinc, and of solution of stannous chloride, which plays such an important part in the various schemes for the identification of the synthetic colors, was then tried with the view of ascertaining what, if any, effect such reagents would have upon vegetable colors.

The zinc and hydrochloric acid reaction was produced by adding 1 c.c. of 31·9 per cent. hydrochloric acid to 5 c.c. of the color solution contained in a test tube similar to that previously described, and then adding about 0·5 grammes of metallic granulated zinc and allowing the reaction to continue for at least thirty minutes before making any observations.

The solution of stannous chloride was made by dissolving 5 grammes of pure tin foil in 30 grammes of 31·9 per cent. hydrochloric acid and afterward diluting the solution with water to make 50 grammes. One cubic centimeter of this solution was added to 5 c.c. of the color solution in a test tube similar to the one described previously, and any changes were noted after the mixture had been allowed to stand for five minutes.

The following results were obtained:

Tests with reducing agents. The following fruit colors produce no change in zinc and hydrochloric acid or in a solution stannous chloride: Blackberry, cherry (black), cherry (red), cranberry, currant, elderberry, grape, huckleberry, plum, raspberry, strawberry.

TESTS WITH REDUCING AGENTS.

Other Vegetable Colors.	Zinc and Hydrochloric Acid.	Solution Stannous Chloride.
Annatto	no change	no change
Beet Juice	slightly lighter	no change
Brazilwood	much lighter	no change
Cochineal	no change	no change
Cudbear	decolorizes	decolorizes
Fustic	decolorizes	no change
Litmus	decolorizes	decolorizes
Logwood	slightly lighter	no change
Madder	no change	no change
Marigold	decolorizes	no change
Red Saunders	no change	no change
Safflower	no change	no change
Saffron	decolorizes	no change
Turmeric	decolorizes	no change
Commercial Coal Tar Colors.		
One	decolorizes	decolorizes
Two	decolorizes	decolorizes
Three	decolorizes	decolorizes
Four	decolorizes	decolorizes

In glancing over the preceding table it will be seen that none of the pure fruit colors are affected by either of these reducing agents, while some of the other vegetable colors are either considerably modified or completely destroyed, and in the cases of every one of the synthetic colors examined complete decolorization took place, although it must be said in explanation that there are some non-reducible synthetic colors in use at the present time.

It will also be seen that of all of the vegetable colors only cudbear and litmus are affected by the stannous chloride solution, which adds another factor to the ease of their identification.

In view of the fact that chlorophyll, which is often used as a source of commercial green colors, shows certain easily recognizable characteristics when observed through the spectroscope, this method of examination was applied to every one of the foregoing colors without any distinctive results whatever.

Solution of sodium hypochlorite added to the acidulated color solution produced immediate decolorization in every instance, regardless of the origin of the color.

In summarizing the results of these investigations, which have been conducted during a period of about a year, the author would state that in his opinion, the presence of a coal tar color can be positively detected and that the authenticity of any given sample of fruit juice or fruit syrup may be absolutely proved.

The recognition of many of the other vegetable colors which may be added is facilitated by the application of several of the tests herein recorded and reference to the appropriate table in each case.

Certain well known identity tests for such colors as turmeric and logwood were not included in the foregoing work, as they are well established and need no further investigation.

It has been the intention of the author to contribute these data, most of which are new, with a view of clearing up many of the difficulties which constantly arise, and to aid the solution of the numerous problems which are called upon to be solved in consequence of the enforcement of the laws against food adulteration, and, as the collecting of these data has been of great value to him, he submits them in the hope that others may profit in an equal degree.

DR. CHRISTOPHER WITT.

AN EARLY AMERICAN BOTANIST AND A MAN OF MANY AND VARIED ATTAINMENTS.

By M. I. Wilbert,
Apothecary at the German Hospital, Philadelphia.

In the year 1614 there was published at Ratisbon, in Germany, a book that purported to contain the true history of the Rosicrucian Society. According to this history, a German, Christian Rosenkreuz by name, had visited the Orient in 1378, and was there initiated into the most profound secrets of occult philosophy and entrusted with the true knowledge of the philosopher's stone and the elixir of life.

On his return to Germany, Rosenkreuz is said to have gathered about him a number of disciples and to have founded the fraternity of the Rosicrucians, or followers of Rosenkreuz. Three of these

disciples were entrusted with the great secrets, and they in turn agreed among themselves that they would not practise any profession in public but that of medicine; that they would not wear a distinctive garb or uniform; that they would meet at least once a year at a regularly appointed spot or place; that they would endeavor to interest such intelligent laymen as would be likely to be interested, and who could subsequently be entrusted with their secrets; and, in conclusion, that they would endeavor to keep the existence of the society secret for one hundred years.

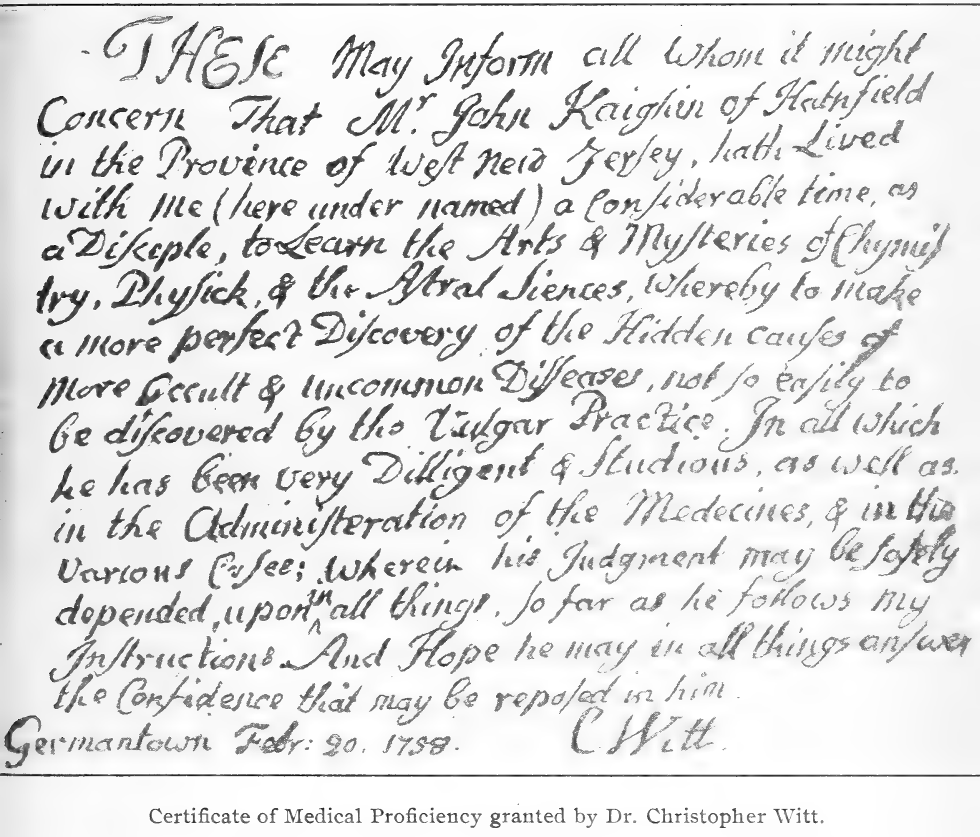
Whether the history, as narrated in this book, was based on fact or whether, as is sometimes asserted, the book itself was written to ridicule the "Societas Physicorum" of the previous century, and the questionable practices and theosophical teachings of the followers of Paracelsus, need not be discussed in this connection; certain it is that, after the publication of this "Fama Fraternitatis," as it was called, the professed adherents of the society became quite numerous, and, in addition to this, a number of more or less allied societies were founded in several of the different countries of Europe. It should be added, however, that many of these co-related societies were not directly connected with what were usually supposed to be the true followers of Rosenkreuz. Thus the "Collegium Rosianum," also frequently referred to as Rosicrucian, which existed during a portion of the seventeenth century, particularly in France, was founded by one Christian Rosé, and was quite distinct, in origin at least, from the Rosicrucians of Germany. This Collegium Rosianum spread rapidly, and soon had branches at The Hague, Amsterdam, Nürnberg, Danzig, and also in England.

Among the earlier Rosicrucians in England was one Robert Flood, born in Kent in 1574. Flood is said to have been a noted physician in London, and to have been an expert student of the occult sciences. Another of the English leaders of this cult was Sir Kenelm Digby, a natural philosopher of some repute, a royalist and at one time chancellor to Queen Henrietta Maria. He was born on June 11th, and died on the same day of the same month in 1665.

During the second half of the seventeenth century, following what was at first a purely religious movement to revive the declining piety among the more educated people of Germany, there originated a number of societies that became known as "Collegia

Pietatis," and subsequently as true Rosicrucians. The originator of this, at its inception purely religious movement, was Philip Jacob Spener, a Lutheran clergyman, born at Rappoltsweiler in Alsace, January 13, 1635, and died in Berlin, February 5, 1705.

Spener himself, it would appear, was as yet not quite free from the religious and speculative mysticism that prevailed in Europe


THESE May Inform all Whom it might Concern That Mr. John Kaighin of Hatnfield in the Province of West New Jersey, hath Lived with Me (here under named) a Considerable time, as a Disciple, to Learn the Arts & Mysteries of Chymistry, Physick, & the Astral Siences, Whereby to make a more perfect Discovery of the Hidden causes of more Occult & uncommon Diseases, not so easily to be discovered by the Vulgar Practice. In all which he has been very Dilligent & Studious, as well as in the Administeration of the Medecines, & in the Various Cases; Wherein his Judgment may be safely depended upon in all things, so far as he follows my Instructions. And Hope he may in all things answer the Confidence that may be reposed in him.

Germantown Febr: 20. 1758. C Witt.

Certificate of Medical Proficiency granted by Dr. Christopher Witt.

during the seventeenth century, for as early as 1680 he formulated the dogma that only persons inspired by the Holy Ghost could understand the Scriptures. It need not surprise us, therefore, that at an early date these Pietists were confounded with the Rosicrucians of an earlier period, and that many of them really simulated the practices of the Rosicrucians to such an extent that it would be difficult indeed to determine, through the atmosphere of secrecy,

theosophy, magic and alchemy with which they were surrounded, whether religious convictions or theosophic vagaries really prevailed.

One chapter at least of this Collegia Pietatis has had a peculiar and permanent influence on the development of the medical and pharmaceutical sciences in these United States, and may, therefore, be discussed at greater length.

About 1690 there was founded in the city of Erfurth, in Thuringia, a chapter of the Collegia Pietatis under the patronage or leadership of the Rev. August Hermann Francke, then the assistant pastor of a Lutheran church at that place. The secret meetings of this organization soon attracted the attention of the government authorities, and, after some investigation, resulted in the promulgation of an edict suppressing the chapter and excommunicating Francke from the State Church. Francke, who was thus compelled to leave Erfurt, subsequently went to Halle, where he founded the now world-renowned orphan asylum, generally known as "Das Hallische Waisenhaus." From a pharmaceutic point of view, the method of securing funds for building and sustaining this institution, is quite interesting. It appears that among the earlier members of the Erfurth chapter of the Collegia Pietatis was an alchemist or chemist, Burgstaller by name, who, at his death, bequeathed to Francke the receipts for compounding certain medicines. These medicines were subsequently made and sold for the benefit of the orphanage in Halle. They were supplied through a regular system of agencies, and sold in every country of the world to which Lutheran missionaries had access. The most popular among these nostrums was the "Gold Tincture," also known as golden drops, "Mutter Tropfen" and "Goldendur" in this country. Large quantities of this gold tincture were sent to this country, particularly to the province of Pennsylvania, and even at the present time an imitation of this nostrum constitutes a popular household remedy in some sections of Pennsylvania. After the edict for the suppression of the chapter of Pietists, at Erfurth, was put in force a number of the members under the leadership of Johann Jacob Zimmermann decided to emigrate to the then newly founded province of Pennsylvania, where, under a more liberal form of government, they might follow their mysterious practices without being molested, and where they might properly prepare themselves for the coming of the millennium, which was thought to be close at hand. Zimmer-

mann, the original leader, died at Rotterdam, in 1693, on the eve of his embarkation for America, and Johannes Kelpius, who had been second in command, was selected to succeed him.

Johannes Kelpius, the son of a Lutheran clergyman, had received a thorough scientific as well as religious training. He was born in 1673, and was therefore only 20 years of age when selected magister. Under the leadership of this young and in many respects inexperienced leader, this chapter of Pietists finally undertook and safely accomplished its journey to the New World.

Here they established themselves on the banks of the beautiful and romantic Wissahickon, just outside of the German town in the vicinity of Philadelphia.

A large number of interesting facts relating to the history of this colony of Pietists in the wilderness have been gathered together by Mr. Julius Sachse, and constitute a large volume entitled "The German Pietists of Pennsylvania."

After they had established themselves in their new home the Pietists were not content to wait listlessly for the end of the world to come, but devoted their time to agriculture and horticulture, the growing of medicinal plants and herbs, the study of astronomy and the practice of alchemy or the black art. In their experiments in the latter, which were conducted only at such times as the stars were favorable, they were assisted by several of the early settlers of the adjoining German town, Philadelphia and Burlington. These early alchemists, who appear to have been quite numerous, would constitute an interesting chapter in the story of the development of chemistry in this country, if the necessarily scattered material could be brought together.

It is quite probable, also, that the first herb garden on this Western Hemisphere was instituted, in connection with this colony of Pietists, in the vicinity of their main building or tabernacle. In 1704 there arrived at this colony on the Wissahickon, a man who was destined to have considerable influence on the development and spread of knowledge in this country, but who, in turn, was not designed to have the recognition that is sometimes accorded to true worth or achievement. This man, a physician, Christopher Witt, or DeWitt, by name, was born in Wiltshire, England, in 1675, and was therefore nearly 30 years of age when he arrived at the tabernacle in the wilderness. Of his earlier life and achievements little or

nothing is known, and the same may be said of his life in the Pietist colony. After the death of the magister, Johannes Kelpius, in 1708, a number of his followers left the colony and established themselves elsewhere. Among these early dissenters were Christopher Witt and his companion, Daniel Geissler, who removed to Germantown, where the former entered on the practice of medicine and the latter attended to the more homely duties about the house and garden. This garden was soon widely known as containing not alone a variety of medicinal herbs and plants, used by the Doctor in the practice of his profession, but also a large and varied collection of indigenous as well as foreign plants and shrubs. The garden itself appears to have been quite extensive, and to have covered considerable ground. Unfortunately, practically all of the information that we have of this garden and its founder is contained in the still existing correspondence between Peter Collinson and John Bartram. From these letters it would appear that for a number of years prior to 1734, the date of the first of these letters, Doctor Witt had been a regular correspondent of Peter Collinson, and had supplied him and others with interesting specimens of American plants and seeds.

Advancing years had evidently made the Doctor somewhat erratic, and it was to secure a more regular supply of novelties, roots and seeds that Collinson began his correspondence with John Bartram, who was then just attracting attention for his knowledge of botany and his faculty for observation. Of the correspondence that passed between Christopher Witt and others, nothing has been preserved so far as known. There can be no doubt, however, that Witt had supplied a number of English botanists with plants and seeds. Peter Collinson himself was closely associated with Dr. Dillenius, the professor of botany at Oxford; Peter Miller, the gardener in charge of the Society of Apothecaries' garden at Chelsea; Dr. John Fothergill, of London, and a number of others more or less interested in flowers and plants.

There can be no doubt, too, that this botanical garden established by Doctor Witt at Germantown, antedates that established by John Bartram at Kingsessing by at least twenty years, and was, if anything, more extensive and more varied.

That Witt was a skilled botanist, and had in addition an intuitive sense of what would appeal to his correspondents in Europe is evident from some of the expressions found in Collinson's letters to

John Bartram, where the latter is not infrequently chided for not sending as interesting or as novel shipments as Dr. Witt. As a direct outcome of this correspondence, John Bartram was induced to cultivate the acquaintance of Dr. Witt, and the two botanists are known to have exchanged visits quite frequently. The account of one of these visits, made by Bartram to Germantown, contains so much to illustrate the varied interests of Doctor Witt than it may well be reproduced verbatim in this connection.

"JUNE 11, 1743.

"FRIEND PETER:—I have lately been to visit our friend Doctor Witt, where I spent four or five hours very agreeably—sometimes in his garden where I viewed every kind of plant that I believe that grew therein, which afforded me a convenient opportunity of asking him whether he ever observed any kind of wild rose that was double. He said he could not remember that ever he did. So, being satisfied with this amusement, we went into his study which was furnished with books containing different kinds of learning—as philosophy, natural magic, divinity, nay, even mystic divinity—all of which were the subject of our discourse within doors, which alternately gave way to botany every time we walked in the garden. I could have wished thee the enjoyment of so much diversion as to have heard our discourse, provided thee had been well swathed from hips to armpits. But it happened a little of our spiritual discourse was interrupted by a material object within doors, for the Doctor had lately purchased of a great traveller in Spain and Italy a sample of what was imposed upon him for snake stones. Besides laughing at him it took me a little time to convince the Doctor that they were nothing but calcined old horse bones.

"Indeed, to give the Doctor his due, he is very pleasant, facetious and plaint, and will exchange as many freedoms as most men of his years, with those he respects. His understanding and judgment thee art not unacquainted with, having had so long and frequent intercourse with him by letters.

"When we are upon the topic of astrology, magic and mystic divinity I am apt to be a little troublesome, by inquiring into the foundation and reasonableness of these notions which thee, knows will not bear to be searched and examined into; though I handle these fancies with more tenderness with him than I should with

many others that are so superstitiously inclined, because I respect the man. He hath a considerable share of good in him.

"The Doctor's famous Lychnis, which thee has dignified so highly, is, I think, unworthy of that character. Our swamps and low grounds are full of them. I had so contemptible an opinion of it, as not to think it worth sending, nor afford it room in my garden; but I suppose by thy account, your climate agreeth so well that it is much improved. The other, which I brought from Virginia, grows with me about 5 feet high, bearing large spikes of different coloured flowers, for three or four months in the year, exceeding beautiful. I have another wild one, finely speckled and striped with red upon a white ground, and a red eye in the middle, the only one I ever saw.

"Our worthy friend Colden wrote me he had received a new edition of 'Linnæus's Characteres Plantarum,' lately printed. He advised me to desire Gronovius to send it to me. I should be very glad to see it. The first I saw was at the Doctor's (Witt), and chiefly by it he hath attained to the greatest knowledge in botany of any I have discoursed with.

"JOHN BARTRAM."

The reference in this letter to the common occurrence of a certain plant probably illustrates better than anything else the difference in the methods followed by Witt and by Bartram. The latter frequently made long trips to gather seeds of plants that were to him uncommon, while the former sent such seeds and plants as he thought would be interesting to his correspondents. The reference is in answer to a paragraph contained in a letter from Peter Collinson, dated June 16, 1742, in which he says: "I have a Lychnis from Doctor Witt different from any yet that I have seen. It seems to be king of that tribe. Its stalk is near as thick as my little finger (which is but small for a man). It is now about 2 feet high, and yet no flowers appear. The stalk is most finely spotted, which is very distinguishing from all the rest that I have ever seen."

Dr. Witt evidently had a good classical education as well as a thorough training in the medical sciences of that time. He is said to have had a number of students in languages, the classics and also in medicine. In Dr. Packard's "History of Medicine in the United States" will be found a reproduction of a certificate of medical proficiency granted by Dr. Christopher Witt to one John Kaighin, of

Hathfield, in the Province of West New Jersey, which bears witness to the fact that this particular student or disciple having had instruction "in the arts of chemistry, physics, and the astral sciences whereby to make a more perfect discovery of the hidden causes of more occult and uncommon diseases, not so easily to be discovered by the vulgar practice," is deserving of the confidence that may be reposed in him.

Of his student, Jacob Philadelphia, Mr. Sachse has given an interesting account in a paper read before the American Jewish Historical Society in 1897.

Among other friends or students, Christopher Sauer, the Germantown printer, and his son Christopher, are said to have spent some time with Dr. Witt on their return to Germantown from the Conestoga. Dr. Witt also had quite a reputation as an astronomer and a mathematician. His description of the comet of 1743 is said to be the most complete of any known description of that phenomenon. The Doctor was, in addition, also an expert mechanic, as well as something of an architect; he is said to have built the first three-story house in Germantown, and to have built it so well that it stood for more than a hundred years after the death of its builder. He is also known to have been an expert clockmaker and is said to have built the first tower clock ever made in the province. One of his own clocks, retained by himself, is said to have struck the hours and quarter hours—quite a feat for that time. He also built for himself a pipe organ and is said to have been quite proficient as a musician. That he was also somewhat of an artist is evidenced by the portrait of Johannes Kelpius, the Magister of the Pietists on the Wissahickon, which is now in the archives of the Pennsylvania Historical Society.

In his own day this diversity of occupation was not, however, compatible with a desirable local reputation. It was chiefly, no doubt, largely due to this diversity of attainments that he was generally considered, by the more simple and superstitious inhabitants of Germantown, as being in league with the evil one, and was popularly known as the Hexenmeister, or master of the witches.

This popular opinion of the true source of Dr. Witts' abilities was still further confirmed when the latter returned from one of his periodical visits to Philadelphia with a negro slave. With the passing years his old friend and associate, Daniel Geissler, had become unable to attend to the many and varied duties about the house and

garden, the older members of the Warmer family, with whom they had been on intimate terms, had died and the two old men probably thought that some younger, reliable help was needed or desirable. The introduction of a mulatto servant into a superstitious German community, in connection with the well-known practices and attainments of the Doctor, naturally suggested the idea, then, that the Hexenmeister had made a new compact with the evil one and that the latter had allowed one of his assistants to come to earth and attend the now ageing man. At all events, the Doctor and his famulus were generally referred to as the "Hexenmeister and his Teufelsbursche."

It should be remembered, however, that the Germantown of the eighteenth century also contained men of more than average learning and ability. Among these Francis Daniel Pastorious, a friend and student of Philip Jacob Spener, the originator of the "Collegia Pietatis," settled in Germantown in 1683, and was, no doubt, the direct cause of attracting Kelpius and his follower to the Province of Pennsylvania. The life and achievements of this early scholar have been immortalized by Whittier in the "The Pennsylvania Pilgrim." Pastorius, it is said, was also interested in botany, and furnished plants and seeds to correspondents in Europe, particularly in Germany. The gardens belonging to Pastorius and Dr. Witt adjoined, and as they were also friends in addition to being neighbors, there is considerable probability that they vied with each other in obtaining the most numerous and the most varied collection of plants.

Another of the well educated inhabitants of Germantown, and also a close friend of Dr. Witt, was Christian Lehman, a man of varied accomplishments, who is said to have been conversant with the Latin, Greek, Hebrew, German and English languages, and to have cultivated the higher mathematics, astronomy and chemistry with great success. Christian Lehman came to America with his father in 1731. He, too, appears to have been interested in botany, and it is said that he was the first to introduce English walnut trees into this country. An advertisement in the *Pennsylvania Gazette* for August 4, 1763, announces that Christian Lehman, in Germantown, has for sale "An assortment of English double hyacinth roots of a variety of colors, as well as sundry other sorts of flower roots of various prices. He also keeps constantly for sale some of the best English walnut trees, as well as other fruit and flowering trees of a size fit to plant out."

Watson, in his "Annals of Philadelphia," says that Christian Lehman, a notary public, surveyor and gentleman, was also able to cast nativities. He had been a student of Dr. Christopher Witt, and was as expert as his master. He cast them for all of his nine children, but never for hire.

One of these nine children, a son, William Lehman, engaged in business as an apothecary on South Second Street, in Philadelphia, where he was succeeded by his son, William, who was prominently identified with the organization of the Philadelphia College of Pharmacy, was its second president, and responsible for its present title. Peter Lehman, who is usually spoken of as the originator of the Philadelphia College of Pharmacy, was a cousin of William Lehman, and served his apprenticeship in the same store. This particular connection, of course, suggests the question as to how much of their early training these and others of the early members of this college owe, indirectly, of course, to Dr. Witt and his associates.

Daniel Geissler, the early companion of Dr. Witt, died in 1745, and was buried in a plot of ground set apart by Dr. Witt and the Warmer family as a burial plot. The now aged and lonely Doctor continued to live alone in the large stone house, attended only by his mulatto servant.

In 1759 Dr. Witt, now in his 85th year, was stricken with an affection of his eyes and gradually became blind. Despite this affliction he still appears to have been a very active man, and on several occasions undertook long trips to gather seeds and plants or to visit his friends. In 1761, when 86 years of age, he visited John Bartram at his house in Kingsessing, although, as the latter says in a letter to Peter Collinson, "He was so blind that he could not distinguish a leaf from a flower."

When we consider the distance from Germantown to Kingsessing, the necessarily poor roads and the primitive methods of conveyance, this was indeed quite a feat for a man of his years and affliction to accomplish.

Peter Collinson, writing in 1759, says: "I am concerned to hear poor Dr. Witt, my old friend, is blind. A well-spent life, I doubt not, will give him consolation and illuminate his darkness."

Of the remaining years of Dr. Witt but little is known. It is probable, however, that he lived contented and well looked after by his negro slave and the descendants of his old friend Warmer. Dr.

Witt died in January, 1765. The *Pennsylvania Gazette* for February 7, 1765, contains the following obituary notice of him: "Last week died at Germantown, Dr. Christopher DeWitt, a gentleman long and well known throughout this and the neighboring provinces for his great services and abilities in his profession of a physician."

Dr. Witt was buried in the little graveyard with his friends, Warmer, Geissler and a number of others, who had been interested in the Pietist colony on the Wissahickon. This little graveyard was at that time generally referred to as Spook Hill. This name had been given it by the superstitious inhabitants of Germantown from the fact that Daniel Geissler and several of the other original members of the theosophical society had been buried there with the peculiar rites of the Rosicrucian Brotherhood, performed over them by Dr. Witt. After the burial of Dr. Witt the place was more than ever shunned, particularly after nightfall.

For many years it was asserted by those who claimed to know that the spirits of the bodies buried in this plot were not at rest, and that they frequently visited the plot at night. It was also asserted that for weeks after the burial of Dr. Witt blue flames were seen to hover over his grave at night. How long these uncanny things appeared no one is willing to assert; they have long since passed into tradition, for a Christian church now occupies the plot, and covers all that was mortal of Dr. Witt, his friend Geissler and his mulatto servant, Robert Claymore. The last will and testament of Dr. Witt should be mentioned, however, as it illustrates as well as anything can his kindly feelings and his true Christian charity. To his servant, Robert Claymore, in addition to securing him his liberty, he bequeathed a plot of ground, the house on it and all the furnishings it contained; also all of the tools, instruments and utensils appertaining to the making of clocks. Also the "great clock which strikes the quarters." To the Pennsylvania Hospital, then a comparatively young and poor institution, he bequeathed the sum of £60 in cash. After making several additional minor bequests, he gave his residuary estate to the descendants of his friend Warmer, who had befriended him on his arrival in the German town.

So lived and died Christopher Witt, physician, naturalist, astronomer, mechanician, artist, musician, alchemist, theosophist and mystic. He was indeed an interesting and strange combination of

scientist and charlatan, religious ascetic and successful business man, scholar and dreamer. Partially forgotten and lost as he is through want of authentic information, and surrounded by a halo of strange tales and traditions, he constitutes a peculiarly attractive link between the scientific theories and practices of to-day and the romantic dreams and mysterious doings of the long ago.

THE TRAINING OF BRITISH PHARMACISTS.

By F. A. Upsher Smith, Pharmaceutical Chemist.

Prof. Carl G. Hinrichs recently referred[1] to the training of pharmacists in Great Britain in a paper which suggests further notes on the same subject, and incidentally a few corrections. Professor Hinrichs states that "any one may be examined for a degree before their universities, whether he studied in England or not." But in England, as regards university examinations, this applies only to the London University; at Oxford, Cambridge and the other universities residence for a certain number of terms is necessary. The examinations of the Pharmaceutical Society, however, may be taken by a student without having studied at any school or college. In England a few students do not give up business for a time to attend school or college, but devote certain evenings during the winter to attendance at local classes in botany, physics and chemistry, and in this way prepare themselves cheaply and slowly for the qualifying examination, the Minor. This, however, is an arduous method of preparing for the examination, and nowadays few adopt it. The majority of students enter a school or college for a six or nine months' course, at the end of which they sit for the Minor. The School of Pharmacy of the Pharmaceutical Society of Great Britain, familiarly known as "The Square," is the leading school, and in a few provincial university colleges a special course is arranged for pharmaceutical students. In these institutions the course for the Minor extends over a whole session, about nine months. In addition there are a number of private schools where the Minor course is completed in three or six months, and where the tuition follows more closely the exact lines of the syllabus. It should be noted that the great majority of candidates for the Minor are trained in

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[1] *Ante*, page 75.

these private schools, chiefly on account of the shorter time taken to get through the course. Another point of importance in studying the training of the British pharmacist is the fact that the majority of students are, unfortunately, content with the Minor, which is the legal qualification to open a shop for the sale of poisons, and confers the title of "Chemist and Druggist."

Another point raised by Prof. Hinrichs is the preliminary training of apprentices. It is *not* obligatory for a youth to pass an examination in the liberal arts prior to his entering a pharmacy as an apprentice, but such an examination must be passed before entering for the Minor. Probably the majority of youths do pass a recognized examination in these subjects before leaving school, and it is much the best for them to do so, as they are then better able to devote themselves to a study of their new avocation. Apprenticeships in Great Britain were of seven years' duration in the early part of the last century, but a period of three or four years is the usual time at the present day. It is interesting to note that apprentices are now very scarce in pharmacy. A few years ago premiums of 100 guineas or pounds were often obtained with an apprentice, and other varying sums down to £50 were quite the rule. In addition, the parents or guardians had to find clothing, books, pocket-money and other personal expenses, as the English pharmaceutical apprentice, as a rule, receives from his master only board, lodging and medical attendance when required. There are many pharmacies in England to-day where apprentices would be taken eagerly without premium, so scarce are they. In Scotland the conditions of apprenticeship are rather different. Many apprentices there live at home and may receive some remuneration during their pupilage. Many reasons are advanced to account for the dearth of apprentices in England, of which the most likely is that a lad who is sufficiently well educated at school to pass a preliminary examination which would be accepted by the Pharmaceutical Society would also be eligible to enter the more professional callings, *e. g.*, medicine or the law. When the whole cost of training in pharmacy is added to the cost of a business the total would usually exceed the cost of entering a profession. It is well known that in Great Britain the earning power of a retail pharmacist is small, and the well-paid posts in pharmacy are few in number, comparing unfavorably with the professions named. But whatever the reason, the fact remains that apprentices

to-day are scarce; consequently assistants are becoming scarce, and if there is no adjustment of the balance the result will be to the ultimate advantage of those who do enter the calling.

In comparing the relative ages of American and English students in schools of pharmacy, Professor Hinrichs comments on the more mature appearance of the latter; this difference is easily explained. Candidates for the Minor must be twenty-one years of age, and, as the course of instruction at a school does not extend over more than nine months, it follows that prospective candidates remain in business until about the age of twenty. The usual age for leaving school is sixteen, and if the apprenticeship is over before the age of twenty is reached, a post is readily obtained in the interval as an unqualified assistant in a pharmacy. The "Minor" examination itself is usually regarded with awe by candidates. This is owing to the fact that the examination is partly practical and partly oral. Hence a nervous candidate is placed at a disadvantage throughout the whole examination. There is no valid reason why written papers should not be set in theoretical chemistry, physics, botany, pharmacy, prescription-reading and materia medica, supplemented by a certain amount of *viva voce* examination in some or all of these subjects. But at present there is no written paper and the nervous man suffers accordingly. Many absurd instances are quoted of nervousness in this examination. One candidate, during an examination in practical pharmacy, was told to help himself to an apparatus for coating pills in the far corner of the dispensing-room. He returned after a time with a lemon-squeezer! I have known students, the best of their year, misname such familiar drugs as gentian root and senna leaves. Alterations in the Major Examination which confers the title of "Pharmaceutical Chemist" are at present under the consideration of the Council of the Pharmaceutical Society. It has been recently proposed[1] by the Board of Examiners, that in future the subjects of the Major Examination shall be: (*a*) chemistry and physics; (*b*) materia medica and pharmaceutics; (*c*) botany. Of these subjects it is proposed that (*b*) should be obligatory on all candidates, together with either (*a*) or (*c*). The advantages claimed for this suggested reform are: (1) That a larger number of candidates may be expected to present themselves for the Major Examination.

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[1] *Pharmaceutical Journal*, May 6, 1905.

(2) Encouragement will be given to candidates to specialize on the physical or biological side. (3) The increased importance given to materia medica and pharmaceutics by the extension of the time devoted to them in the examination will encourage the teaching of these subjects, and induce more students to become expert in what should be regarded as the most important branches of the art of pharmacy. (4) The inclusion of pharmaceutics with materia medica on a suitable syllabus will insure that a candidate who takes the biological side will be sufficiently examined in applied chemistry to avoid any diminution of the real value of the title of "Pharmaceutical Chemist." One member of the Board, Professor Trail, suggested that in the case of candidates taking the biological side, zoology might with advantage be added to the subjects for the Major Examination. The Boards, while regarding the suggestion as worthy of consideration, do not at present press the point. The scheme has only just been published, and so far there has been no time for correspondence in the pharmaceutical journals. It would seem to be a wise departure. There are many pharmacists who would find it useful to have a wider knowledge of chemistry than is obtainable in the present Major course of instruction, owing to the time devoted to botany. And, *vice versa*, those who wish to devote themselves more to biological studies would, under this scheme, be allowed to drop part of the course in chemistry. The need is great for attracting more candidates to the Major examination. For pharmacists to hold their own with the medical men with whom they come in daily contact it is very desirable that their training in pharmacy should be as thorough as possible. It is to be hoped that a trial may be given to this scheme of specialization.

PRACTICAL NOTES ON PHARMACEUTICAL SUBJECTS.

By Thos. S. Wiegand.

It may seem strange to come before the pharmaceutical meeting with the simple subjects which my paper treats of; but recent conversation with some who have had good opportunities to learn convinces me that it is well to reinforce the lessons they have received from far more able teachers.

First the subject of percentage solutions, which seems so plain to most pharmacists, is still a stumbling-block to some who should

know what they are and how to prepare them. A description of such simple apparatus as is needed will perhaps be the best and easiest way to make the subject plain to those who fail at first to understand the matter.

Thus a 1-per cent. solution of cocaine hydrochlorate is readily made by mixing 10 grains of the salt with a small quantity of distilled water and pouring it into a vial previously counterpoised on a scale, and then adding distilled water until it balances 1,000-grain weight. To save trouble in making subsequent lots, a mark may be made on the vessel, and the salt weighed mixed as before with a small quantity of distilled water, and the required quantity of distilled water added to make the measure of 1,000 grains.

It has been found very convenient and a great saving of time to keep a solution of strychnine sulphate, which is often prescribed, in mixtures of such strength that 2 fluid drachms will contain 1 grain of the salt, so that by using 1 fluid drachm of the solution when ½ grain of the salt is prescribed much time is saved and the thorough mixture of the salt is secured.

A mixture of arsenious acid and sugar of milk is also found to be useful, 1 grain of the acid being triturated with 15 grains of dry granulated sugar of milk until an impalpable powder is obtained; if ½ grain of the acid is prescribed, 8 grains of the mixture will be required.

Triturates of arsenious acid, strychnia, corrosive sublimate, calomel, morphine and several other active remedies are found very useful, and render dispensing them safer and much easier.

Phosphorus is sometimes prescribed in pilular form, and many dispensers have found it quite troublesome to make such pills and to be certain that the exact quantity is in every pill. A method that has proven satisfactory is to weigh a given quantity of the phosphorus, place it in a test-tube and add sufficient pure carbon bisulphide to dissolve it; then butter of cocoa is added in small portions until fifteen times its weight has been added. The test-tube should be first fitted with a cork and the mixture shaken after each addition of the cocoa butter, and when all has been added the test-tube should be placed in warm water and shaken until thoroughly mixed. Of course, each 16 grains of this mixture will contain 1 grain of phosphorus, and in this way the phosphorus can be easily made into pills with the other articles directed in the prescription.

While manipulating it, a few drops of chloroform may be put into the mortar to exclude air and prevent any likelihood of oxidation; the pills when finished may be coated with a little mucilage of gum arabic, or ethereal extract of tolu, and rolled in finely powdered sugar.

Pills containing essential oils are often a trouble to the dispenser, particularly if more than a drop is directed in each pill; this is especially the case when resinous substances are directed with it. This trouble is readily obviated by a small quantity of powdered castile soap.

Camphor also is troublesome to make into pills, as they have so little coherence. This annoyance is easily obviated by adding a small quantity of powdered resin to the camphor; a quite coherent mass is thus obtained. It is not desirable to use it if the pills are to be long kept, as they will become quite soft.

Nitrate of silver is frequently prescribed in pilular form, and the great tendency of this salt to be decomposed in the presence of organic matter renders it proper to seek a substance free from this objection. It is best found in pure kaolin, or precipitated silica, the salt being first reduced to powder, and a sufficiency of the clay or silica made ductile by a very small quantity of glycerite of tragacanth (2 parts of the gum to 100 parts of glycerin); the mass then well mixed and divided, observing to refrain from the use of steel spatulas in dividing it.

Permanganate of potassium is also troublesome material to form into pills, as it is so powerful an oxidizing agent. In this case the salt is to be powdered, and then incorporated with butter of cocoa, which, having no solvent power over it, makes a satisfactory vehicle; if the weather be very warm, a little white wax may be melted with the butter of cocoa before making the mass.

ON THE SERUM TREATMENT OF HAY FEVER.[1]

By Dr. A. Luebbert.

A number of investigations on the etiology and specific therapy of hay fever, which have been conducted in this institute, have been

[1] Abstract of a paper prepared at the suggestion of Prof. Oscar Liebreich, by Dr. Luebbert, of the State Hygienic Institute of Hamburg, of which Prof. Dunbar is director, and published in the *Therapeutische Monatshefte* for December, 1904.

reported by Dunbar and his students. To these should be added the experiences acquired last summer. The object of this paper, written at the request of Professor Liebreich, is to discuss briefly the question of the serum treatment of hay fever.

The conception that hay fever is caused in persons disposed to it by pollen is found in the older literature on the subject, especially in the English. The proof, however, has been brought by Dunbar's exact experiments for the pollen of a considerable number of plants. These experiments have been verified by numerous investigators, both in the Old and the New World. The following is a list of plants the pollen of which are the cause of hay fever: Syringa vulgaris, Secale cereale, Avena sativa, Hordeum sativum, Avena flavesscens, Oryza sativa, Calamagrostis lanceolota, Calamagrostis montana, Calamagrostis Halleriana, Dactylis glomerata, Poa pratensis, Anthoxanthum odoratum, Eriophorum vaginatum, Cynosurus cristatus, Phalaris arundinacea, Lolium perenne, Holcus lanatus Alopecurus pratensis, Aira caespitosa, Brachypodium silvaticum, Agropyrum repens, Festuca elatior, Festuca gigantea, Triticum sativum, Bromus mollis, Lonicera caprifolium, Convallaria majalis, Polygonatum multiflorum, Oenothera biennis, Brassica Napus, Carduus acanthoides, Leucanthemum vulgare, Solidago odora, Solidago nemoralis, Solidago canadensis, Centaurea Cyanus, Chrysanthemum, Aster, Zea Mays, Carex vulgaris, Carex intermedia, Carex arenaria, Carex paniculata, Carex glauca, Carex alba, Carex verna, Atriplex hortense, Ambrosia trifida, Ambrosia artemisiaefolia, Ambrosia elatior, Ambrosia maritima, Xanthium macrocarpum, Iva xanthifolia, Spinacia oleracea.

In connection with this list, and to the completion of which work is unceasingly continued, it may be observed that the hay fever of Europe and the June cold of North America is principally produced by the pollen of grasses, the widely spread and dreaded Autumnal cold of North America is caused by the pollen of ragweed (Ambrosia) and of goldenrod (Solidago), also of asters and chrysanthemums. Right here it may be stated that in this paper we shall not be able to go into further details concerning the autumnal cold of America.

From the pure active pollens a protein-like substance has been isolated according to Dunbar's directions by precipitation with salt and alcohol. This substance is highly toxic when applied to patients

susceptible to hay fever, but indifferent in its action to persons not predisposed to the same. This poison has been examined chemically by Kammann, who arrived at the following conclusions:

(1) The hay fever poison belongs to the toxalbumins.

(2) It is thermostable.

(3) The toxin is stable toward acids, but very sensitive toward alkalis.

(4) Enzymes, such as pepsin and trypsin, do not destroy it entirely.

(5) By the complete saturation of its solutions with ammonium sulphate it is precipitated.

According to more recent investigations of Kammann, soon to be published, the antitoxin is (combined) quantitatively bound with the serum globines.

The symptoms produced by the toxin in hay-fever patients will vary according to the place of application. With conjunctival application of the poison, there have been observed itching, lachrymation, photophobia, injection into limbus and conjunctiva even to chemosis. Applied to the nose it caused sneezing, profuse secretion, reddening and swelling of the mucous membrane to the extent of rendering discharge impossible. Aspiration of the toxine, when brought about accidentally while weighing the substance, produced a desire to cough with a difficulty to breathe out, and stridor. When rubbed into the skin intense itching resulted, accompanied by local erythema and rash. Injected subcutaneously, all of the above-mentioned symptoms were produced; sternutation, nasal hypersecretion, asthma, urticaria over the entire body, accompanied by a temporary light to medium disturbance of heart activity, namely, palpitation of the heart, a rapid and very feeble pulse, dyspnea and marked cyanosis. The poison, therefore, appears to excite primarily the vasodilatory and secretory nerve fibres. These phenomena caused Alberts to regard hay fever merely as a sympathetic neurosis.

Sensitiveness to the poison varies with different individuals within wide limits.

Among those who were the subjects of this investigation the most sensitive ones showed a decided condition of local irritation, both objectively and subjectively, after the instillation of $\frac{1}{400}$ milligram of the proteid of rye pollen into the conjunctival sac. In the

most of the cases which were under observation the average effective dose was from $\frac{1}{1000}$ to $\frac{1}{2000}$ of a milligram.

Sensitiveness to the toxin, as proven by our tests, is almost uniformly constant for the same individual.

Two cases may be cited which bear upon this point, one of them has received more than a thousand applications of the toxin to his eyes and his nasal mucous membrane during the last fifteen months, and the other several hundred during the same period.

The reaction in these two cases is as prompt and almost as intense as it was at first, the dosage remaining constantly the same. This point is emphasized in order to show that there is no noteworthy active immunity to the toxin, notwithstanding the fact that this might have been anticipated in accordance with Romer's experiments in producing immunity in rabbits by the instillation of Abrin into the conjunctival sac. These investigations have shown that the victims of hay fever have a particular sensitiveness to the pollen of certain plants, and especially to that of the graminaceae. The determination of the etiology of this disease may, therefore, be regarded as accomplished, particularly since Liefman has demonstrated, in addition to the facts previously established, that the appearance of the pollen of the graminaceae is parallel with that of the appearance and severity of the hay fever. In the meantime the extensive investigations relating to the preparation of an antitoxin, which had been undertaken as soon as the origin of the disease had been definitely determined, had reached a preliminary conclusion.

By the inoculation of rabbits, goats and horses, serum was obtained which neutralized the pollen toxin in vitro, and, in practice, protected those who were susceptible to hay fever from its attacks.

The manufacture of the serum, which was undertaken by Schimmel & Co., of Militz, in the Spring of 1904, consists in injecting the poison subcutaneously in gradually increased doses into horses which had proven sensitive to a preliminary inoculation. As a rule the formation of the antitoxin begins after two or three months of treatment and increases from week to week. At first the increase is rapid; it then gradually becomes less rapid, until finally the maximum appears to have been reached. With regularly withdrawn samples of blood a systematic titration of the antitoxin upon the hay-fever patient is accomplished in the following manner:

First.—The weakest concentration, for example of a solution of

the rye pollen protein is determined, of which one drop instilled into the conjunctival sac will just cause, within a few minutes, a subjective and objective reaction. This may be termed the maximum dosage. Then a series of toxin and antitoxin mixtures is so arranged that equal volumes of diluted serum are added to definite quantities of a doubly concentrated solution of toxine. The mixture, which just evades irritating the patient's eyes, is designated the neutral mixture.

The effectiveness of the serum is therefore determined by the degree of dilution which is required to neutralize the plain toxin solution.

This determination following the very numerous tests, is not affected by errors exceeding 10 per cent.

Now, from the horse, which has proven its high value, a suitable quantity of blood is withdrawn—at least ten days after the last inoculation—and worked for its serum properties.

The horses which are used for this purpose, being under the constant care of a veterinary surgeon, all manipulations are made under the strictest aseptic precautions. The antitoxin contained in the serum is under constant surveillance, and hence it is possible to obtain an absolute harmless preparation and one constant in its effectiveness. Now with regard to the method of using the serum, it was emphasized from the beginning that this medium was not intended for subcutaneous use, but only for external application at the site of the disease. Neither has the time yet arrived when the subcutaneous method of treatment can be recommended; for even though favorable results have been obtained in very bad cases, such results persist not more than two or three days at the most and even then but a partial immunity is obtained. Besides, the disagreeable feature of subcutaneous injection would, for most people, outweigh their advantages. On the other hand, the local treatment, which consists in the direct application of the serum to the afflicted mucous membrane of the eyes, nose, or pharynx, has proven efficacious.

The serum is used either in the fluid form or in the form of a powder which has been dried in a vacuum.

If the fluid form is used, the addition of a suitable preservative must not be omitted. Carbolic acid may be added for this purpose in the proportion of 1 to 400.

In a comparative test of various suitable mediums for preserving the serum and which would not be irritating to the mucous mem-

brane, carbolic acid was found to be the most desirable. It had the advantage of producing the most efficient antiseptic as well as the additional one of a passing slight anæsthetic action. In spite of this addition, however, a bottle of the serum which is carried about in the warm coat or waistcoat pocket, and is frequently opened for use, remains no longer sterile. There are certain varieties of bacteria found in the air and in the mucus from the nasal mucous membrane which can thrive even in serum containing carbolic acid the proportion of 1 to 400. The presence of such a growth of bacteria signifies the decomposition of the serum and is announced by the uniform cloudiness of the fluid and occasionally by an offensive odor. In order to check the decomposition of serum in a bottle which has once been opened, it is recommended that small quantities of the fluid be poured from the serum container into the small bottle, attached to which is a pipette, and that such and the pipette be sterilized as frequently as possible. The method of using the serum is as follows:

(1) Pour about a third of the contents of the serum-phial into the accompanying empty glass-phial, provided with a dropping pipette. The phial with dropper is sent out in a small wooden case, and should be carried in the pocket as nearly as possible in the upright position.

(2) The method to employ in using liquid pollantin is as follows:

(*a*) For the eye.—Bring, by means of the pipette, one drop to the outer angle of the eye, and drawing down the lower lid with the finger, allow the drop to come into contact with the mucous membrane. A pleasantly cool sensation felt in the eye shows that the instillation has been properly carried out.

(*b*) For the nose.—With the head bent somewhat backwards, insert the point of the pipette about half an inch into each nostril and express one or two drops of pollantin into each. Care must be taken to keep the pipette squeezed so long as it is within the nose, otherwise the pollantin will be drawn back into the pipette again. After pollantin has been introduced into one nostril, the other must be kept closed while the serum is snuffed up from the one treated, tapping the while on the outside of that nostril with the finger.

(3) The pipette, together with its india-rubber head, should be thoroughly cleaned at least once daily, and kept for one minute in boiling water.

(4) Hay-fever patients ought to sleep with closed windows during the hay-fever season.

(5) Pollantin should be used, both for eyes and nose, regularly every morning a few minutes before rising. Should it cause sneezing or reddening of the mucous membrane of the eye, the preparation should be again used after the lapse of one or two minutes, and if the sneezing or the reddening of the eye does not then disappear, the instillation should be repeated a third or even a fourth time.

By this morning treatment the patient will generally find himself insensitive to the hay-fever poison for several hours, often indeed for the whole day.

(6) Those patients who are unable to keep themselves completely free from attacks—even when they begin serum treatment before the commencement of the hay-fever season, always sleep with windows closed, and regularly carry out the above-described morning treatment—are recommended to carry pollantin always about with them. They should use the serum during the course of the day whenever there is the slightest sign of irritation, and not wait until a sharp nasal attack sets in, when the nose becomes so swollen and blocked that pollantin cannot be efficiently applied nor properly absorbed from the altered mucous membrane.

(7) If the use of pollantin at the correct time, as described, has been neglected, the serum may sometimes still be used with benefit in the early stages of an attack, stopping the burning in the eyes, the excessive flow of tears and the sneezing. Should, however, the hay-fever poison have entered the body in such amount that the eyes have become strongly inflamed and the nose swollen and blocked with secretion, or that asthma has appeared, then the patient should retire to rooms with doors and windows closed and remain there until all these symptoms have disappeared. By using instillations of pollantin, at first every ten minutes and later at longer intervals, this process can be accelerated. When the patient's condition is once more restored to the normal, he should endeavor to prevent any further attacks by the careful use of the serum as above described.

Although for certain purposes the fluid pollantin cannot be well dispensed with, it yet suffers from many disadvantages, notably: inconvenience in handling, limited stability and the at times, to the very sensitive patient, so distressing carbol feature.

Compared to same the powdered form represents a decided progress. This preparation is obtained by completely drying the serum in vacuo at 45° C., and mixing it with sterilized sugar of milk; it represents a very fine yellowish and almost odorless powder.

This should be snuffed into the nostrils or blown in with an insufflator, and can be dusted upon the conjunctiva with a camel's hair brush.

According to the reports which have thus far been received, the pollantin in powder form is preferred by most patients on account of its manifest advantages. True, some patients have stated that repeated use of the powder in the eyes produces unpleasant irritation of the conjunctiva, and that consequently they prefer to use the fluid pollantin for the eyes, though they continue to give the powder the preference in the treatment of the nasal symptoms.

In fact, this plan is probably the most appropriate for cases in which the eyes require frequent treatment. On the other hand, the application of a small quantity of the powder once or twice daily will cause no plaint and afford sufficient protection.

In a large number of cases in which the treatment was limited almost exclusively to the nasal mucous membrane, there was relief to all the symptoms, even including those which pertained to the eyes.

The somewhat forcible snuffing of the powder into the nostrils caused a disagreeable irritation in some cases, but this was remedied when it was insufflated with a powder blower. (The one mentioned by Dr. Goldstein, of St. Louis, is a handy and suitable one.) The snuffing of the powder into the nostrils is not always effective in the treatment of the annoying irritation of the throat and palate, and for this symptom the use of the powder blower is recommended.

One patient was accustomed to apply the pollantin powder to her palate with her finger, thus quickly succeeding in relieving the irritation.

The method of using the pulverized serum includes the following particulars:

(1) A portion of the pulverized pollantin, as large as a lentil, is dropped into the little scoop attached to the stopper of the pollantin bottle. The scoop is then held under one of the nostrils, the other nostril being compressed and occluded by the finger. The powder is then snuffed into the open nostril, the snuffing being repeated

several times, and during the same the ala of the nostril is lightly tapped with the finger to distribute the powder over as much of the mucous membrane as possible.

(2) If the powder is also to be used for the eyes, the accompanying camel's hair brush is lightly dipped into it, the brush being then gently applied to the inner surface of the attached lower lid, or a small quantity of the powder may be shaken upon it from the brush. With each new bottle of the powder a new brush should also be brought into use.

The additional points for the application are covered by the directions given for treatment with the liquid pollantin.

Whether the serum is used in its fluid or powdered form, the method of using it should be strictly in conformity with the directions given.

In addition to the use of the serum, rational prophylactic measures should also be observed during the hay-fever season, for only in this way can good results be obtained.

The first measure of prophylaxis consists in properly protecting the body during the hours of sleep, when the reflexa which are excited by pollen (sneezing, coughing and lachrymation) are more or less quiescent, from the invasion of the pollen influence. The windows and doors of the sleeping-room must remain closed, as far as possible, during the hay-fever season; also the windows on the windward side of the house. The washed garments which have been bleached upon the lawn should be thoroughly beaten before they are used, and the clothing should be carefully brushed before the house is entered.

Self-understood, no flowering plants whose pollen may induce hay fever, must be suffered to remain in the house.

The pollen should be applied to the mucous membrane as early in the day as possible, preferably on awakening, even though there may be no immediate evidence of irritation. The application should be repeated several times during the day, and always in anticipation of the causes for the expectant severer attack.

Therefore, before walking in the open, riding or wheeling, and above all at appearance of the slightest irritating indications.

The latest application for the day should not be immediately before retiring, but an hour or two previous, for otherwise the serum may form a sticky crust upon the mucous membrane. As a rule,

from three to five applications per day will suffice to keep one free from discomfort.

Many patients have now and then observed that immediately following the use of the serum an increased irritation was manifested, and believed such at first as due to its use.

In these cases the nose had been previously irritated, and it became necessary to apply the serum not only once, but several times in quick succession before the irritation was removed.

RECENT LITERATURE RELATING TO PHARMACY.

SOME NEW ESSENTIAL OILS.

Messrs. Schimmel & Co., in their semi-annual report for April-May, 1905, pp. 82–86, give the results of their examinations of the following oils:

Oil from *Fagara octandra* L. (Rutaceæ). The oil obtained from the wood of the tree originates from Mexico, and has a bright-yellow color and a linalool-like odor; $d_{15°}$ 0·922; a_D + 2° 30′; ester number 6·09; soluble in 0·5 volumes 90 per cent. alcohol, when more than 1·5 volume alcohol is added, cloudiness occurs.

Oil from *Inula graveolens* L. Desf. This composite, which is distributed largely in the countries of the Mediterranean, yields on steam distillation a brown oil with a greenish fluorescence; $d_{15°}$ 0·9754; a_D — 36° 40′; acid number 8·45; ester number 161·3; ester number after acetylation 239·38; soluble in 3 to 3·5 and more volumes 70 per cent. alcohol, with large separation of paraffin. Judging from the odor the oil contains bornyl acetate.

From London we received a distillate originating from Australia of the Myrtacea *Backhousia citriodora* F. v. Müll., which is there indigenous. Years ago[1] we examined a similar oil and described it briefly; the present sample agrees well with the former one. The bright yellow oil has an aroma like lemongrass oil, but finer; its specific gravity is 0·8972 at 15°; a_D ± 0°; about 95 per cent. aldehyde, probably exclusively citral; soluble in 1·8 and more volumes 70 per cent. alcohol.

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[1] Report April, **1888,** 20; Comp. also Gildemeister and Hoffmann, "The Volatile Oils," p. 538.

A sample received from the South of France, of oil of the leaves of *Cupressus Lambertiana*, a tree which is often found in the gardens on the Riviera, differs essentially from ordinary cypress oil. The odor of the yellowish green oil has a melissa character which is probably due to the presence of citronellal. When extracted with sodium bisulphite, aldehydic constituents could actually be detected, but their quantity was too small to identify them; the odor pointed to citronellal or a fatty aldehyde. The non-aldehydic portions had a pepper-like odor, and may possibly contain cymene. The other properties of the oil were the following: d_{15° 0·8656; α_D + 31° 53′; acid number 1·5; ester number 13·9; ester number after acetylation 50·82; forms a cloudy solution with 9 to 10 volumes 80 per cent. alcohol, and a clear solution with 0·5 per cent. and more volumes 90 per cent. alcohol. The yield of oil was about 0.1 per cent.

From the same source originated an oil from the leaves of *Laurus Camphora*. The oil, obtained from the leaves of a tree growing in a garden at Cannes, is in so far specially interesting, that it has a pronounced cardamom-like odor, and, as was shown by the examination, is also closely allied in its composition to the cardamom oils. The oil has little resemblance to previously examined[2] distillates from the leaves of *Laurus camphora* L. It is an open question to what cause these differences must be attributed. The oil, obtained in a yield of about 0·52 per cent., was colorless and behaved as follows: d_{15° 0·9058; α_D — 26° 12′; acid number 0·34; ester number 8·82; ester number after acetylation 46·9; soluble in 1 and more volumes 80 per cent. alcohol. The oil boils at 4 mm. between 35° and 95°. In the lowest boiling portions we detected pinene (melting point of the nitrolbenzylamine 123°); the presence of camphene is probable, but it could not be proved with certainty (by conversion into isoborneol). The oil further contains large quantities of cineol (melting point of the iodol-compound 112°).

From the oil-portions passing over above 76° at 4 mm., there was obtained by fractionating *in vacuo* repeated several times, a principal fraction (α_D — 58° 23′) boiling between 85° and 86° (5 mm.), which represented about 10 per cent. of the oil employed, and, as the further examination showed, consisted of l-terpineol, which was more closely identified by its phenyl urethane (melting point 112°).

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[2] Comp. Gildemeister and Hoffmann, "The Volatile Oils," p. 371.

By inoculating the fraction (of which the temperature had been much reduced) with solid terpineol, and letting it stand in the cold for a prolonged time, terpineol of the melting point 35° was obtained.

Oil from *Amomum mala*. An oil very similar to the one just described was received by us from the Biologico-agricultural Institute of Amani (German East Africa). The brownish-yellow oil obtained in a yield of about 0·76 per cent., is a distillate from the pulverized fruit (seed and peel) of *Amomum mala*, a Zingiberacea very widely distributed in the forests of German East Africa. This oil is also closely allied in its properties and composition to the cardamom oils which (contrary to the preceding oil) is explained by its botanical origin. A preliminary examination showed that this oil also contains much cineol (melting point of the iodol-compound 112°), and also terpineol. The oil distilled over at 7 mm. between 51° and 100°; $d_{15°}$ 0·9016; a_D — 10° 54′; acid number 3·5; ester number 1·7; ester number after acetylation 67·05; makes a cloudy solution with 1 to 1·5 and more volumes 80 per cent. alcohol.

Oil from an African species of Labiatæ. An oil also originating from German East Africa, from a species of Labiatæ growing there wild concerning which we have not yet had any further information. The red-brown oil had an odor like thymoquinone; $d_{15°}$ 0 9594; saponification number 42·67; ester number after acetylation 164·6; soluble in 1·5 and more volume 80 per cent. alcohol; from the dilute solution flakes (paraffin ?) separate off after some time.

The cultivation of andropogon grasses has also been tried at Amani. We recived from there the following two oils:

Vetiver oil. The oil distilled from fresh roots has a bright yellow color; $d_{15°}$ 1·0023; a_D + 33° 42′, acid number 16·06; ester number 12·16; ester number after acetylation 142·35; soluble in 1 and more volume 80 per cent. alcohol.

The oil corresponds to the distillates produced in Réunion, and is a normal product serviceable for the purposes of the perfumery trade. The differences between this oil and the oils distilled in Germany may be explained by the different character of the distillation material.

Less favorable are the results of the experiments made with the cultivation of *Andropogon citratus* D. C., at least the sample of

Lemongrass oil obtained from fresh plants, which has been sent to us, cannot be considered a competing product, as the following

constants will show: d_{15° 0·9123; α_D — 0° 15′; aldehyde-content about 60 per cent. The oil dissolves in 0 8 volume 80 per cent. alcohol, but when further diluted heavy cloudiness occurs; the behavior towards 90 per cent. alcohol is the same. The last-named property also belongs to the West Indian distillates, and the those obtained in the Cameroons.[1]

We would finally mention the oil from Hardwickia binata Roxb. (*Oil of ennaikulavo*) which has been sent to us from London. The tree which is found in British India belongs to the Leguminosæ. The balsam has a red-brown color, green when in a very thin film, and shows a green fluorescence. The odor is peculiar, and not exactly pleasant; d_{15° 1·0021; acid number 96·15; ester number 12·31; insoluble in 10 volumes 80 per cent. alcohol. On steam-distillation about 44 per cent. of a colorless fairly mobile oil passed over, whilst a brittle green resin remained behind. The distillate had the following constants:

d_{15° 0·9062; α_D — 7° 42′; acid number 0·85; ester number 2·88; soluble in about 5 and more volumes 95 per cent. alcohol.

Of oils distilled by ourselves we mention the following novelties:

Oil from bay berries from the Bermuda Islands. The yellow brown oil has an aromatic odor which, however, clearly differs from that of the ordinary bay oil. The yield of oil amounted to 3 66 per cent; d_{15° 1·0170; α_D — 7° 3′; phenol-content 73 per cent.; soluble in 1·5 volumes 70 per cent. alcohol, cloudiness when more than about 4 volumes were added; soluble in 0·5 and more volumes 80 per cent. alcohol.

The phenols consist of eugenol (melting point of the benzoyl-compound about 70°). The non-phenols contain abundant quantities of l-phellandrene (melting point of the nitrite recrystallized from acetic ether 103° to 104°); myrcene, however, does not appear to be present in the oil.

Oil of *Artemisia annua* L. (Compositæ). The oil obtained in a yield of 0·29 per cent. from the green herb cultivated by ourselves, has a lemon-yellow color and a pleasant, refreshing odor, reminding distantly of sweet basil. The specific gravity was 0 8912 at 15°,

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[1] Comp. Reports October, **1902,** 50; April, **1903,** 49; October, **1903,** 46; October, **1904,** 53.

the optical rotation a_D — $1^\circ\ 18'$; acid number 3·8; ester number 19·2; ester number after acetylation 44·5; the oil dissolved in 1 to 1·5 volumes 80 per cent. alcohol, but when more alcohol was added opalescence or cloudiness occurred owing to a large separation of paraffin.

CORRESPONDENCE.

THE UNITED STATES PHARMACOPŒIA.

The fifth annual meeting of the Board of Trustees of the United States Pharmacopœia Convention was held at the Philadelphia College of Pharmacy, May 13th. The members present were: Dr. J. H. Beal, Scio, O.; Mr. Albert E. Ebert, Chicago; Prof. Joseph P. Remington, Philadelphia; Mr. S. A. D. Sheppard, Boston; Dr. H. M. Whelpley, St. Louis; Dr. H. C. Wood, Philadelphia. In the absence of Chairman Charles E. Dohme, who is in Europe, Vice-Chairman Beal called the meeting to order.

The minutes of the fourth annual meeting and the intervening correspondence of the board were read and approved.

It was decided that a sample page or pages of new books in which it is desired to use some of the text of the Pharmacopœia shall be submitted to the chairman or acting chairman for approval before permission to use pharmacopœial text be given.

Professor Remington, chairman of the Committee on Revision, made a detailed report of the progress of the work, and stated that the new Pharmacopœia would be out before the end of June. The action of the chairman in fixing August 1, 1905, as the date from which the new revision will be official, was approved. One hundred unbound copies will be distributed simultaneously to pharmaceutical and medical journals for review purposes.

All books paying for the use of pharmacopœial text will be required to print upon the obverse of the title page the following words in full-face or black-letter type: "Authority to use for comment the Pharmacopœia of the United States of America, Eighth Decennial Revision, in this volume, has been granted by the Board of Trustees of the United States Pharmacopœial Convention, which Board of Trustees is in no way responsible for the accuracy of any

translations of the official weights and measures or for any statements as to strength of official preparations."

The subject of a Spanish edition of the Pharmacopœia was reported upon by President Wood. He was instructed to continue his investigations and again report to the board. Dr. Wood finds considerable demand for a Spanish edition of the United States Pharmacopœia in Cuba, Mexico, Costa Rica and Porto Rico.

The Rice Memorial Fund Committee made a final report. Mr. S. A. D. Sheppard was appointed a special committee of one to take charge of this fund and deposit the same in the name of the Board of Trustees of the U. S. P. Convention.

It was decided that as soon as sufficient moneys shall have been received after paying present indebtedness and current bills that the sum of $200 be paid to each member of the Committee on Revision, excepting the chairman (Prof. J. P. Remington), to whom shall be paid $2,000; to the secretary of trustees (Dr. Murray G. Motter) $500, and the treasurer of the convention (Dr. George W. Cook) $200. The secretary of the board reported progress on the Abstract of Proceedings of the Board of Trustees, and further action was postponed.

The following officers and standing committees were elected for the ensuing year: Chairman, Charles E. Dohme, Baltimore, Md.; Secretary, Dr. Murray G. Motter, Washington, D. C.; Executive Committee, Dr. J. H. Beal, Scio, O. (chairman); Dr. H. C. Wood and Charles E. Dohme; Auditing Committee, Dr. H. M. Whelpley, St. Louis, Mo. (chairman); Dr. A. E. Ebert, Chicago, and S. A. D. Sheppard, Boston, Mass.

H. M. WHELPLEY,
Secretary, U. S. P. Convention.

ST. LOUIS, MO., May 30, 05.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

A COURSE IN QUALITATIVE INORGANIC CHEMISTRY. By Arthur L. Green and Chas. E. Vanderkleed.

This little book of 158 pages seems to be very acceptable. It is particularly strong in introducing and leading up to the subject of qualitative analysis, so that the student does not learn the mechanical work of analysis without thoroughly understanding the fundamental principles and reactions.

There seems to be a special feature of nomenclature and definitions. Stress is also put on the writing of equations, for which the rules seem to be particularly clear and comprehensive.

The brief mention of the ionization in solutions is an excellent example of the way in which the book is brought up to date.

The scheme is simple and only modified from well tried forms in ways that inspire every confidence, rather than otherwise.

The whole treatment is very systematic and thorough without being too lengthy, and the mechanical work makes it very easy for reference.

To show the arrangement of the book, the sections treated therein are as follows: Definitions, nomenclature and notation; equations; reagents; rules leading to the analysis of metals; the detection of metals (including scheme of analysis); table of precipitation; rules leading to the analysis of acids; the detection of acids (including scheme); special tests for acids, and directions for teachers.

S. S. SADTLER.

PROCEEDINGS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION AT THE FIFTY-SECOND ANNUAL MEETING. Held at Kansas City, Mo., September, 1904. Also the Roll of the Members. Baltimore: Published by the American Pharmaceutical Association, 1904.

Volume LII of the proceedings of the American Pharmaceutical Association comes to us with a number of radical, but more or less desirable, changes. The most evident of these changes is to be found in the report of the discussions on papers and motions; these discussions are for the first time in many years reported in abstract, in place of reproducing them verbatim, as on previous occasions. This single innovation has resulted in the saving of at least 100 pages of printed matter and, in addition, gives the book a much more presentable appearance. In addition to this, much of the stereotyped material that has been published annually for many years has been omitted, and the duplicate list of members has been condensed into a single list.

More than one-half of this volume of more than 1,000 pages, or a total of 531 pages, is devoted to the report on the progress of pharmacy. This report, as on former occasions, constitutes practically a year-book or review of all the literature relating to pharmacy, and is by far the most important feature of the book. Altogether it

may be said that this book constitutes one of the most valuable, most interesting and most readable volumes of the proceedings of the American Pharmaceutical Association so far published. The index, comprising some sixteen double-column pages, is still incomplete, and might readily be improved on; this is, however, a minor defect, and will undoubtedly be remedied in future volumes of the proceedings.

M. I. WILBERT.

AMERICAN PHARMACEUTICAL ASSOCIATION.

The following is the provisional programme for the Atlantic City meeting of the American Pharmaceutical Association:

Monday, September 4th, 10 A.M.—Meeting of the Council; 3 P.M.—First General Session; 8.30 P.M.—Reception.

Tuesday, September 5th, 10 A.M.—Second General Session; 3 P.M.—Section on Commercial Interests; 8 P.M.—Section on Education and Legislation.

Wednesday, September 6th, 10 A.M.—Section on Education and Legislation; 3 P.M.—Section on Historical Pharmacy; 8 P.M.—Section on Scientific Papers.

Thursday, September 7th, 10 A.M.—Section on Scientific Papers; 3 P.M.—Meeting of Conference of Teaching Faculties, meeting of Association of Boards of Pharmacy; 8 P.M.—Lecture on Radium by Prof. Charles Baskerville.

Friday, September 8th, 10 A.M.—Section on Practical Pharmacy and Dispensing; 3 P.M.—Section on Practical Pharmacy and Dispensing; 8 P.M.—Installation of new officers.

Saturday, September 9th, 10 A.M.—Last General Session.

COMMITTEE ON SCIENTIFIC PAPERS.

To the Members of the A. Ph. A.:

The Committee on Scientific Papers invite contributions of scientific interest for presentation at the forthcoming meeting at Atlantic City.

The committee will endeavor to arrange the programme so that every paper submitted will receive consideration. Contributors will aid the committee if they will send their papers to the chairman as early as possible.

The attention of members is called to the change in Article IV, Chapter 14, of the By-Laws, adopted at the Kansas City meeting

last year, which provides that "Any person desiring to submit a paper to the Association shall present to the chairman of the particular section to which it refers at least ten days prior to the meeting an abstract of said paper, indicative of its contents, and consisting of not less than fifty nor more than 200 words. This abstract shall be printed as a part of the programme. The paper itself must be submitted to the officers of the section previous to the first session."

The committee take pleasure in announcing that Dr. Charles Baskerville, Professor of Chemistry in the College of the City of New York, has consented to deliver a popular lecture on "Radium and Radio-activity," on the evening of Friday, September 8th. The lecture will be experimentally illustrated.

Contributors are requested to send their papers to the chairman by July 20th. Eustace H. Gane, chairman, 91 Fulton Street, New York; Daniel Base, associate; Charles E. Caspari, Secretary.

June, 1903.

THE HISTORY OF THE PHARMACY OF THE CIVIL WAR.

The Committee on Historical Pharmacy of the American Pharmaceutical Association has undertaken to collate data bearing on the military and naval pharmacy of the Civil War, and has issued an appeal for aid from all who have any knowledge of the subject. The men who participated in that struggle are fast passing away, and it is to be hoped that the committee will be successful in its effort. The committee requests all who are in a position to furnish information on the subject, or who can suggest possible sources of information, to communicate with any of the officers of the section as follows: Albert E. Ebert, chairman, 426 State Street, Chicago, Ill; Prof. Edward Kremers, historian, University of Wisconsin, Madison, Wis.; Caswell A. Mayo, secretary, 66 West Broadway, New York

DELAWARE PHARMACEUTICAL SOCIETY.

The nineteenth annual meeting of the Delaware Pharmaceutical Society was held in Wilmington on Thursday, June 8, 1905. The business session opened at 11 A.M. and lasted three hours. John F. Hancock, of Baltimore, made an address eulogizing the late Prof. William Procter, Jr., recounting what had been done in the way of

establishing a suitable memorial, and closing his address by making a strong plea for subscriptions towards defraying the expenses of such memorial. He was followed by N. B. Danforth, who referred to his acquaintance with Professor Procter and rejoiced in the knowledge that Procter's name is on his diploma. On motion a Committee on Procter Memorial Fund was appointed.

The Philadelphia representative of the N. A. R. D., gave a report of what the Association has accomplished, and pointed out how the work of the Association may be made of more value to the retailer by the retailer giving information of all violations of the contract plan which come to his knowledge.

Resolutions were adopted endorsing the work of the N.A.R.D., re-endorsing the text of the Mann Bill, and urging the reduction of the internal revenue tax on alcohol.

At 2 P.M the meeting adjourned to the Hotel Wilmington for dinner, after which, by means of carriages, the members were conveyed through the historic Brandywine Park, giving a fitting ending to a very pleasant occasion. F. P. STROUP.

MISSOURI PHARMACEUTICAL ASSOCIATION.

The Missouri Pharmaceutical Association held its twenty-seventh annual meeting at Pertle Springs, Warrensburg, June 13–16, 1905. It was the eighth meeting at this summer resort.

Thirty-five new members were elected and thirteen dropped for non-payment of dues, leaving a total of 314 on the roll. The following papers, talks and demonstrations were presented:

(1) The Second Missouri Pharmaceutical Association Meeting, by H. M. Whelpley.

(2) The Malay Medicine Man, by J. F. Llewellyn.

(3) Prescription and Dispensing Chips, by Francis Hemm.

(4) The First Weekly Drug Journal in Missouri, by H. M. Whelpley.

(5) Some Laws of Direct Interest to Us, by Francis Hemm.

(6) Official Chemicals—Digest of Examinations, by Charles E. Caspari.

(7) The First Drug Periodical in Missouri, by H. M. Whelpley.

(8) Addenda to Second Missouri Pharmaceutical Association Meeting, by H. M. Pettit.

(9) Timely Topics, by H. M. Whelpley.

(10) Microscopy and the New Pharmacopœia, by H. M. Whelpley.

(11) Anilin Colors, by William Mittelbach.

(12) Leisure Moments Turned into Days of Profit, by Charles L. Wright.

(13) Report on Adulteration of Drugs, by Ambrose Mueller.

(14) Proposed Changes in the Missouri Pharmacy Law, by Charles L. Wright.

(15) The Druggist, by F. R. Dimmitt.

(16) Pharmacy in 1880 and Now, by Paul Schweitzer.

The Board of Pharmacy reported that 86 had registered on diploma, 42 by examination and 144 failed during the year. A meeting of the Board was held at Pertle Springs June 12th, and 14 of the 35 examined were registered. Charles Gietner, of St. Louis, and G. W. Carmack, of Plattsburg, were endorsed as candidates for a vacancy on the Board which occurs July 1st.

Charles L. Wright is chairman of a committee to adapt the Beal Model Pharmacy Law to Missouri conditions and report at the 1906 meeting.

The N.A.R.D. was voted $50.

The Council was empowered to elect new members between the dates of annual meetings. The following officers were elected: President, J. F. Llewellyn, Mexico; Vice-Presidents, Charles D. Morrow, St. Louis; W. R. Ashbrook, Jamesport, and Louis Grother, Cole Camp; Treasurer, William Mittelbach, Boonville; Permanent Secretary, H. M. Whelpley, St. Louis; Assistant Secretary, R. C. Wesner; Local Secretary, J. V. Murray, Warrensburg; Council: Ed. G. Orear, chairman, Maryville; Paul L. Hess, vice-chairman, Kansas City; Dr. Otto F. Claus, secretary, St. Louis; William H. Lamont, St. Louis, W. E. Bard, Sedalia.

Delegates: A. Ph. A., Dr. Otto F. Claus, St. Louis; N. A. R. D., Charles L. Wright, Webb City, Ill.; Ph. A., Dr. H. M. Whelpley, St. Louis.

President Llewellyn announced the following chairmen of committees: Deceased Members, John P. Dow, Sedalia; Drug Adulteration, Dr. Charles E. Caspari, St. Louis; Exhibits, Fred Pierce, Nevada; Entertainment, Lorenz A. Seitz, St. Louis; Ladies' Auxiliary Entertainment, Mrs. H. M. Whelpley, St. Louis; Legislation, Charles L. Wright, Webb City; National Formulary, Mrs. D. V.

Whitney, Kansas City; Membership and Attendance, William H. Lamont, St. Louis; Papers and Queries, Prof. Francis Hemm, St. Louis; Trade Interest, H. D. Faxon, Kansas City; Transportation, Aug. T. Fleishmann, Kansas City; United States Pharmacopœia, William Mittelbach, Boonville.

A special committee on Fire Insurance was appointed in response to a communication from the Ohio Valley Pharmaceutical Association.

The meeting was one of the most enthusiastic and enjoyable in the history of the Association. The 1906 meeting will be held at Pertle Springs, June 12th–15th.

H. M. WHELPLEY.

PHARMACEUTICAL MEETING.

The closing Pharmaceutical Meeting of the series for 1904–05 of the Philadelphia College of Pharmacy was held Tuesday afternoon, May 16th, with E. M. Boring, a member of the Board of Trustees, in the chair.

Thomas S. Wiegand, Ph.M., who has been librarian of the College for some years past, read a paper entitled "Practical Notes on Pharmaceutical Subjects" (see page 326), and exhibited in connection therewith some apparatus. He said:

"It may be well to exhibit a few vessels that render the methods just noted for percentage solutions of easy execution. For the solution of corrosive sublimate, which is frequently used in sterilizing articles used in surgical cases, a bottle is to be selected which holds exactly 7,000 grains (1 pound avoirdupois), 7 grains of the salt are mixed with a small quantity of distilled water, the solution poured into the bottle and then filled with distilled water; this bottle should be kept ready for use at all times. For strychnine sulphate to be used in dispensing, a 2-ounce glass stoppered vial that contains exactly 2 fluid ounces when the stopper is in its place is desirable. This vial should be properly labeled and the formula strychnia sulphate, grs. iv, distilled water *f*℥j, should be marked on it. All these active remedies should be kept in a special part of the dispensing counter used only for such active remedies."

M. I. Wilbert, remarking on the use of preservatives for solutions of salts of cocaine, said they were not permissible, particularly boric

acid. He said that it was not the spoiling of the solution, that is, the formation of microscopic organisms, which was to be guarded against so much as the hydrolysis of the salts, these being very unstable. He also said that it was very difficult to produce the solutions of gelatin used in surgery, as they cannot be sterilized, and referred to several fatal cases of poisoning which had occurred lately, particularly in Germany. He said that some manufacturers put up sterile solutions of gelatin which are intended to be diluted with sterile water.

With regard to percentage solutions, Mr. Wilbert said that the work was much simplified by making the calculations in the metric system and by the use of metric weights and measures.

Mr. Wiegand agreed with this, and said that he did not believe in converting one system into another, particularly when in a hurry. He thought it was much better to use either one system or the other.

Mr. Boring said that there was an advantage in using alcohol in making strychnine solutions, as it not only helped to dissolve the salt, but also was an advantage in dispensing.

M. I. Wilbert, Ph.M., read a paper on "A Quarterly Review of Progress in Pharmacy," which was published in the June issue of this JOURNAL (Vol. lxxvii, p. 281).

In discussing the paper Joseph L. Lemberger, Ph.M., of Lebanon, Pa., referred to the recent amendment of the Pennsylvania pharmacy law, and said that it was much easier to amend a law than it was to enact it in the first place. He thought that a great advance had been made, particularly when it is remembered that the people in the country have not the advantages in an educational way enjoyed by the residents of cities.

Mr. Wilbert said that the educational system in Pennsylvania is at fault. He said we should try to get back of the schools, and that there would be an advantage in having a universal body to look after the educational work in the State, as is the case in New York, and that the teaching body should not conduct the examinations.

Wm. McIntyre, who is a member of the Board of Education in Philadelphia, agreed that there would be an advantage in having a central educational body, which would advance the people's school on the one hand and at the same time consider the interests of the universities. He said it was often a question as to how far the pub-

lic schools should be advanced, and that there often seemed to be a gap between these and the universities.

Prof. Henry Kraemer gave a short talk on "An Experiment in the Growing of Medicinal and Other Plants," which was illustrated with a number of lantern slides. The observations made will be embodied in a paper and published later.

FLORENCE YAPLE,
Secretary pro tem.

NOTES AND NEWS.

MEMORIAL SERVICES FOR THE LATE E. H. SARGENT were held in Booth Hall, Northwestern University Building, Chicago, on the afternoon of June 8th. The services were largely attended by family friends, Chicago druggists and the faculty and students in the School of Pharmacy. As part of the program, President T. F. Holgate told of Mr. Sargent's connection with the School since its inception, and of his continued aid as a member of its Executive Committee until the time of his death The Rev. Louis P. Mercer, of Cincinnati, O., for many years pastor of the deceased, related incidents drawn from personal experiences illustrative of his character as a man. Mr. Henry Biroth, President of the Chicago Veteran Druggists' Association, spoke on behalf of many business friends and associates, and Mr. Albert E. Ebert gave a short account of Mr. Sargent's services to the American Pharmaceutical Association.

UNIVERSITY OF MICHIGAN.—Owing to the death of Dr. A. B. Prescott, of the University of Michigan, last February, the office of Dean of the School of Pharmacy was made vacant. At the last meeting of the Board of Regents, held on May 13th, Prof. J. O. Schlotterbeck, Junior Professor of Pharmacognosy and Botany, was elected to fill the vacancy.

Prof. A. B. Stevens, Professor of Pharmacy, who has been studying at Berne, Switzerland, for the past two years, returns early in September, and will take up his duties in the School of Pharmacy.

THE LEWIS AND CLARK PHARMACEUTICAL CONGRESS.—Plans are now being matured to hold a Pharmaceutical Congress at the Lewis and Clark Exposition, Portland, Ore. It is proposed to convene the Congress July 11–14, holding eight to ten sessions. The Washington, Oregon and California State Associations of Pharmacy will also hold joint sessions at that time. The headquarters will be at the "American Inn" which is in the Exposition grounds.

Papers are to be presented pertaining to the history of Pharmacy and to the status of Pharmacy on the Pacific Coast. A series of from fifty to sixty of these papers will be devoted to a concise and carefully prepared and condensed report on pharmaceutical progress up to date, including, in so far as possible, citations of the more important literature on the various subjects. It is intended to appoint well-known authorities on the various branches of the art and science of pharmacy, who shall serve as chief contributors, requesting them to prepare the summaries as suggested above, giving them full power and authority to appoint assistant contributors to aid them in their work.

THE AMERICAN
JOURNAL OF PHARMACY

AUGUST, 1905.

A REVIEW OF THE EIGHTH DECENNIAL REVISION OF THE PHARMACOPŒIA OF THE UNITED STATES OF AMERICA.

By M. I. Wilbert,
Apothecary at the German Hospital, Philadelphia, Pa.

The long delayed, and anxiously awaited, eighth decennial revision of the Pharmacopœia of the United States of America has finally been published, and, according to a decree imprinted on the title-page of the book, is to be the official authority on all matters pharmaceutic on and after the first day of September, 1905.

As an appropriate introduction to a review that will be limited, as much as possible, to a comparison of the changes that have been made, with the general principles involved in the instructions given the revision committee by the National Convention of 1900, it may be permissible to quote the introduction to a somewhat similar review, printed in this Journal seventy-five years ago (A. J. P., Vol. II, page 316), on the occasion of the publication of the first revision of the Pharmacopœia of the United States of America, in the city of New York, in 1830.

The review itself is unsigned, but was probably written by the editor, Dr. Benjamin Ellis, at that time the Professor of Materia Medica and Pharmacy in the Philadelphia College of Pharmacy. He says:

> If there be any department of learning in which a spirit of severe criticism may be laudably indulged it is in the examination of such a work as a Pharmacopœia. The preparation of a "code of medicines" is, in the present state of science, a task requiring microscopical minuteness of research, accurate learning, and extensive practical knowledge. Europe may be said to abound in Pharmacopœias of great merit, suited to the uses of particular districts. Each

of these contains, in addition to what may be called the common stock of medicines, that peculiar to its own locality, and therefore marking it with distinctive characters.

Neither is there any want of works of great learning and value upon the natural and chemical history of drugs. Some of the most eminent natural philosophers of the age have not thought it beneath them to illustrate the science of pharmacy by their labors; and there is therefore no excuse left but indolence or ignorance, for any gross errors in so important a work as a Pharmacopœia.

The skill displayed in its compilation may for this reason be viewed by strangers as no unfair index of the state of science in the community which is satisfied with the performance; for in a work requiring, not extraordinary talent, but patience, research, learning and accuracy, we may rest assured that the skill which the public sentiment requires will soon be brought to the task.

We are therefore disposed to examine every work of the kind which issues from our press with jealousy and to give it a close scrutiny, and we seize the present, which is our first opportunity of vindicating the rights of the JOURNAL of the College of Pharmacy to sit in judgment upon so important a matter.

Much that is said in the succeeding twenty pages that are devoted to the review of this, the first, revision of the U.S.P., would apply equally well to the recently published eighth decennial revision of the same book, as the two have many points in common.

The first revision, as does the one before us, includes doses.

The first revision, as does the eighth, represents, for the science of pharmacy, a marked step in advance.

The first revision of the U.S.P. was put to press in five months from the date of the meeting of the delegates in June, 1830; the present, eighth revision, has required more than five years.

The first revision was thoroughly, and somewhat severely, criticized, and it is to be hoped that the eighth revision will be criticized even more thoroughly, though less severely and with a greater degree of moderation.

The privilege assumed by the editor of the AMERICAN JOURNAL OF PHARMACY, three-quarters of a century ago, to sit in judgment on authoritative works of this kind has, since then, been repeatedly exercised, and each succeeding decennial revision of the Pharmacopœia of the United States of America has been critically reviewed for the purpose of pointing out its shortcomings and its weaknesses. This criticism has always been presented, not for the purpose of depreciating, or detracting from the popularity of the book, but with the idea of interesting all classes of pharmacists in the necessity of improving the work and thus induce them to contribute their obser-

vations and experiences for the purpose of making the succeeding revision more perfect and more acceptable than the present.

It is with this same purpose in mind that the present review of the general principles involved in this, the eighth, revision is presented, as a forerunner of other more detailed criticisms of the same book. For more than two decades the Pharmacopœia of the United States of America has admittedly been ranked among the most satisfactory, the most practical, and the most scholarly of the various pharmacopœias of the world. Of neither the revision of 1880 nor of 1890 could it be said that the committee having the revision in charge, attempted, in any way, to ignore the plain instructions that were given them by the respective National Conventions, and while it has been asserted that the resulting Pharmacopœias were too highly scientific in character it must be admitted by all who have the interests of American pharmacy at heart, that it was directly due to this highly scientific character of our national standard that American pharmacy has made the progress that it has in the last fifteen or twenty years. That the present, eighth, decennial revision should represent a distinct step in advance, even on the admittedly admirable Pharmacopœia of 1890, was to have been expected, particularly in view of the advances that have been made in all branches relating to the science of Pharmacology. In many respects this expectation, justified as it was, is fully met, if not exceeded, by the committee on revision, who, particularly in connection with the chemistry of the book, present us with a very large number of tests and descriptions that should do much to place this revision at the head of all similar works of reference. For the painstaking work that they have done in connection with the book the members of the committee amply deserve and should duly receive the unreserved and hearty thanks of the physicians and pharmacists of the country.

That the same book, despite the five years of painstaking work that has been expended on it, would not, and practically could not, meet with universal approbation was also to be expected, and the present revision committee will undoubtedly welcome any and all criticisms and suggestions that are made for the purpose of improving on the scientific character, general usefulness and adaptability of the Pharmacopœia, as a guide and reference in future decades.

The whole book, as published, comprises a total of more than 760 large 8vo pages, well printed on an excellent quality of paper.

In the general style of its make-up it closely resembles the Pharmacopœias published by the revision committees of 1880 and 1890. The materia medica of the new Pharmacopœia is comprised in 510 pages and includes a total of 957 titles, 33 less than are found in the Pharmacopœia of 1890 and 40 less than were included in the Pharmacopœia for 1880.

The general trend of the articles in the several revisions is well shown in the appended table, giving the comparative number of the drugs and preparations, in these several revisions, compared with the list of articles included in the latest edition of the German Pharmacopœia.

TABLE NO. I.—GIVING COMPARATIVE NUMBER AND VARIETY OF ARTICLES INCLUDED IN THE THREE MOST RECENT EDITIONS OF THE U.S.P. AND IN THE GERMAN PHARMACOPŒIA FOR 1900.

	U.S.P. 1880.	U.S.P. 1890.	U.S.P. 1900.	Phar Germ. 1900.
Vegetable	264	255	220	177
Animal	15	18	21	15
Chemical	233	239	267	178
Galenical	481	473	443	234
General formulas	4	5	6	23
Cross references	—	—	—	1
Total	997	990	957	626

From a comparison of these figures it will be seen that while the actual as well as the comparative number of the official vegetable drugs has decreased, the drugs of animal origin have slightly increased. Articles of a chemical nature have increased very decidedly and there is a corresponding falling off in the number of galenical preparations. The number of general formulas has been increased but slowly in the U.S.P., and in this particular our National Standard is certainly far behind the German Pharmacopœia, which, as may be noted above, includes no less than 23 general formulas or descriptive articles or headings.

This lack of general headings, particularly in view of the instructions given the committee in paragraph 6 of the general principles to be followed in revising the Pharmacopœia, is greatly to be deplored and constitutes one of the questions that should be very freely discussed and commented on with a view of obviating any similar action by the revision committee that will be appointed in 1910 to go over and if possible improve on this present edition.

Some Pharmacopœial Problems.—As a fitting prologue to the revision of the Pharmacopœia of 1890, the then chairman of the Committee on Revision, Dr. Charles Rice, contributed a paper on the subject of pharmacopœial problems to this JOURNAL (A. J. P., 1899, page 558). In this paper Dr. Rice outlined what to him appeared to be problems of sufficient interest to be worthy of general discussion. The innovations and additions that were suggested by him, in this particular paper, were practically all adopted, so that much of what is new in the present Pharmacopœia may be directly traced to the foresight and suggestions of the late chairman of the Committee on Revision.

The absence of several of the distinctive features of the earlier Pharmacopœias, particularly the omission of the list of preparations in connection with official drugs, will be a marked disappointment to many and will do much to detract from the value of some of the new additions.

In discussing the uses that the medical profession might have for a pharmacopœia, Dr. Rice, in the paper quoted above, says:

"The main objects which a physician usually has, or would have, for consulting a pharmacopœia are to ascertain:

"(1) What form or forms of administration are officially available in the case of a certain drug?

"(2) What is the strength of the respective preparations?

"(3) What are the ordinary doses?"

In the sixth and seventh decennial revisions a physician could readily find an answer to the first two questions but not to the third. In the present, eighth decennial, revision the answer to the third question is supplied, but the information formerly included as an answer to the first, and really most important, of these questions has been entirely omitted.

The omission is all the more unfortunate as the Committee on Revision offers no adequate substitute and does not even mention why the lists of preparations, formerly included, have been so unceremoniously dropped.

In addition to being a readily accessible and generally reliable source of information for the physician, these lists of preparations were also of considerable interest to the pharmacist as a readily-referred-to guide to the official preparations of any particular drug. To the student, these lists were especially valuable, as they enabled

him to become familiar with the names of the different official preparations in which the several articles were used as component parts.

As noted above, the Committee on Revision does not appear to have taken cognizance of the absence of this particular feature, and as no direct mention is made concerning them, in the instructions given the committee by the National Convention, it is just possible that they have been inadvertently overlooked.

Scope of the Pharmacopœia.—To men who are actively engaged in following up the advances and the needs of the science of medicine, it is becoming more and more evident that a pharmacopœia, to be acceptable and satisfactory to the community for which it is designed, must, in addition to a proper consideration of the articles that are more or less distinctive of local conditions, take cognizance of the tendency to recognize international standards for such drugs and preparations as are known and used in a greater number of the civilized countries of the world.

That the national convention of 1900 was imbued with a realization of this particular necessity is evidenced by the tone and the character of the instructions embodied in the "General Principles to be Followed in Revising the Pharmacopœia." That a majority, at least of the members of the Committee on Revision, have not been awakened to, or at least have not been sufficiently impressed by, this evident necessity for international standards for the more widely used drugs and preparations, is evidenced by the rather indifferent way in which many of the clear and definite instructions to the Committee on Revision have been carried out. One of the shortcomings in this direction, but by far not the greatest, is to be found in the committee's attempt to solve the admittedly intricate problem connected with the admission of "synthetized products of definite composition."

With the rapid dissemination of scientific facts that is possible at the present time, there is an ever-decreasing necessity for giving any particular heed to purely local demands for official recognition of any particular substance or preparation. When, on the other hand, widely-known and widely-used preparations are recognized, some attention should be directed to the requirements, uses, names and limitations of these same preparations in other countries.

The recognition of the so-called synthetic chemicals, constituted

as Dr. Rice pointed out in the paper quoted above, a peculiarly difficult problem. This problem is made still more intricate by the varying laws and regulations that exist in the different countries relating to proprietary rights in patents and trade-marks.

To illustrate some of the complications and differences that future revision committees will have to contend with it may be well to compare the trade and the accepted chemical name of several of these newly-admitted synthetic preparations with the official titles that are given them in the new U.S.P., the B.P. and last edition of the German Pharmacopœia.

Antipyrine. Phenyldimethylpyrazolon.
U.S.P. Antipyrina.
B.P. Phenazonum.
Ger. Phar. Pyrazolonum phenyldimethylicum.

Chloralamid. Chloralformamide.
U.S.P. Chloralformamidum.
Ger. Phar. Chloralum formamidatum.

Phenacetine. Par acetphenetidin.
U.S.P. Acetphenetidinum.
B.P. Phenacetinum.
Ger. Phar. Phenacetinum.

Sulphonal. Diethylsulphonedimethylmethane.
U.S.P. Sulphonmethanum.
B.P. Sulphonal.
Ger. Phar. Sulfonalum.

Trional. Diethylsulphonemethylethylmethane.
U.S.P. Sulphonethylmethanum.
Ger. Phar. Methylsulfonalum.

Doses.—The instructions embodied in the "General Principles to be Followed in Revising the Pharmacopœia," under the sub-heading "Doses," direct that the Committee on Revision "state the average approximate (but neither a minimum nor a maximum) dose for adults, and, when deemed advisable, also for children. The metric system to be used, and the approximate equivalents in ordinary weights and measures inserted in parenthesis." In executing these indisputably plain and explicit instructions, the members of the Committee on Revision cannot be said to have followed them too

closely. They have, as the result of their labors, presented us with a list of "average approximate doses, in the metric system," that will do almost anything but popularize the metric system of weights and measures with the majority of physicians and pharmacists of the United States.

In this connection it would be interesting, indeed, to discover by what manner of reasoning the members of the Committee on Revision were enabled to come to the conclusion that 0·065 of opium more nearly represented an average dose than 0·050; or how and why 0·125 of a given drug should be considered approximately nearer to an average dose than 0·100 of the same substance. To any reasonable individual it would certainly appear that if the members of the Committee on Revision had given the average dose of pharmacopœial articles in full, round decimal quantities, in place of stating, as they practically do, the exact metric equivalents of the average dose in the ordinary weights or measures, they would have, more nearly at least, complied with the spirit as well as the letter of their instructions. The members of the Committee on Revision have seen fit to go even further. In addition to the ludicrous figures that they have given us as representing the average doses of drugs in metric quantities, they have also included, in the introductory notices to the book, a table of approximate measures that in addition to being manifestly incorrect, is not in keeping with any attempt to popularize or to increase the use of the metric system of weights and measures. Here it may be added that with the single exception of "The Pharmacopœia of the New York Hospital," published in 1816, no other representative American pharmacopœia has ever taken cognizance of approximate measures; and while the Pharmacopœia of the New York Hospital simply recommends that when the terms tea- or tablespoonful are used, they be considered as representing approximately the given equivalents, this new, eighth decennial, revision of the U.S.P. directs that the given values for approximate measures *should* be used, despite the fact that they are not in keeping with the actual capacity of the spoons mentioned. So far as the metric system of weights and measures is concerned, the revision committee appear to have lost sight of the fact that metric quantities are decimal in nature and are most readily multiplied by 5 or 10, or multiples of these figures.

Altogether it may be said that the figures that are given in the

new pharmacopœia as representing doses of official articles in metric quantities, bear such a startling resemblance to the corresponding fips, bits, levies and shillings that were formerly used in connection with our decimal system of coinage, that the question inadvertently suggests itself, Can it be that the members of the revision committee, are Rip Van Winkle-like, the reawakened greatnesses of bygone generations?

Changes in Titles.—For many decades it appears to have been the ambition of successive revision committees to establish a record for the number of changes in titles. The Pharmacopœia for 1880 contains a list of 256 changes, and this number was readily exceeded by the revision committee for 1890 with a total of 281 changes. The latter comparatively high number is again exceeded by the present committee, who present us with a list of no less than 297 changes in titles. Of this number 142 are changes in the official Latin and 155 changes in the official English titles of the Pharmacopœia. Many of the changes that have been made are quite in keeping with the instructions that were given the committee by the National Convention. Some of the changes, however, and of these there are not a few, fully illustrate the truism quoted by the president, Dr. Horatio C. Wood, in his address before the National Convention, that: "In this, as in former ages, men are creating confusion by creating names."

The production of such lexicographic monstrosities as "Fluidextractum" and "Fluidextract" should require a more satisfactory explanation than the feeble apology that is offered in the preface of the Pharmacopœia, particularly in view of the fact that the instructions given by the national convention of 1900 distinctly "recommend that changes in the titles at present official be made only for the purpose of insuring greater accuracy or safety in dispensing."

For upwards of half a century it has been customary to abbreviate the titles for this class of preparations by F. E., Fld. Ext., or Ext. (Latin title) Fld. Any one and all of these abbreviations would be manifestly incorrect in connection with the new, official, compounded titles.

In this connection it may be pointed out that the revision committee might have attained precisely the same results by adhering more closely to its instructions and incorporating general formulas or at least by dividing the extract preparations into two logical

classes headed "Extracta" and "Extracta Fluida" respectively. By doing so they could have readily obviated "the intermingling in the text of extracts and fluid extracts" that, as is stated in the preface to the Pharmacopœia, was the sole reason for this change.

By adopting a general descriptive heading for fluid extracts, the revision committee might also have divested the book of a large number of practically useless preparations with which it is at present encumbered.

Among other changes of doubtful utility is the introduction of "Spiritus Glycerilis Nitratis" in place of "Spiritus Glonoini." While the former is undoubtedly proper and perfectly correct from a chemical point of view, it is a stranger in a strange land, and is, like many of the other changes, not fully in harmony with the instructions that should have guided the committee.

Despite the comparatively large number of changes in nomenclature that have been made by the present committee, the members have not seen their way clear to adopt the recommendations of the American Association for the Advancement of Science, as to the spelling of chemical terms. This is rather unfortunate, as several, if not all of the leading medical journals of the country have adopted the more rational spelling for chemical terms, and it is not likely that they will readopt the antiquated superfluities retained by the present pharmacopœia.

In this connection the members of the revision committee would have done well to remember that anything that makes for simplicity makes for progress, and even if they were not prepared to drop the terminal e from the English names for alkaloids, there is practically no reason why the same termination should be retained in connection with such words as bromide, chloride, oxide, etc.

Assay Processes.—The Committee on Revision has given rather a liberal interpretation to the instruction given by the National Convention, "to append assay processes to as many of the potent drugs and preparations made therefrom as may be found possible, provided that the process of assay is reasonably simple (both as to methods and apparatus required) and leads to fairly uniform results in different hands."

In following out these instructions the committee has appended assay processes to at least twenty potent drugs and the preparations made from them. Assay processes have also been appended to

thirteen of the official essential oils. Whether or not all of these processes will fully meet with the qualifications provided in the committee's instructions time alone can demonstrate, as it will require a considerable number of experiments by widely differing operators to demonstrate whether or not the adopted processes "lead to fairly uniform results in different hands."

Purity and Strength of Pharmacopœial Articles.—To fully meet the recommendations of the National Convention, on the purity and strength of pharmacopœial articles, the Committee on Revision has adopted what it is pleased to designate as the "Purity Rubric." While considerable publicity has been given the fact that the adoption of such a standard, or rather series of standards, was contemplated, little or nothing has been known as to the proposed limitations of the permissible impurities, and the official descriptions of the included chemicals will, no doubt, be eagerly scanned by pharmacists and others to learn what, and how much, foreign material may officially be found in, or added to, any given substance.

In common with the assay processes mentioned above, time alone can demonstrate the wisdom, or the desirability, of making much of this particular innovation in the way it has been done. It is quite probable, however, that it would have been more satisfactory if the Committee on Revision had adopted generally attainable standards for purity without laying undue stress on the permissible impurities, or, as stated in the preface to the Pharmacopœia "more accurately defining the limit of purity permissible in official chemical substances."

Regarding the second portion of this item of the instructions, the committee has only partially acceded to that portion which reads:

"It is recommended that the committee keep in view the desirability of at least a gradual approach, upon mutual concessions, towards uniformity with similar preparations of other pharmacopœias, particularly in the case of potent remedies which are in general use among civilized nations."

By comparing the formulas for preparations of potent drugs with the provisions of the protocol signed by the accredited representatives of civilized nations, at Brussels, in 1902 (A. J. P., 1903, page 1), it will be found that our U.S.P. preparations still differ in many particulars from the proposed International Standard.

The committee, it is true, has made a number of important con-

cessions, but there is no reason why the United States of America, as the leading nation of the civilized world, should re use to fully accept provisions that are so evidently in harmony with progress and science as are those adopted by the International Conference for the unification of the formulas of potent medicaments.

Changes in Strength.—The comparative table showing the strength of the more important pharmacopœial substances and preparations in the preceding and in the present Pharmacopœia includes a total of 106 titles. While it is true that many of the changes that have been made are unimportant, and while practically all of them are in the direction of greater uniformity, and therefore to be commended, there are several for which the necessity of the change is not apparent. Why should the strength of chrysarobin ointment be changed from 5 to 6 per cent., or why should the ointment of phenol be changed from 5 to 3 per cent.?

On the other hand, some of the changes that have been made are not quite radical enough. Why, for instance, if any change was thought necessary in the morphine content of opium and its preparations, did the committee not see its way clear to adopt the proposed International Standard for powdered opium, 10 per cent., in place of reducing the maximum content to 12·5 per cent. from 15 per cent., the maximum of the Pharmacopœia for 1890?

The changes that have been made in the strength of a number of frequently used, and, therefore, comparatively important, galenical preparations are of such a nature that they should have been given wide publicity before the book was published, particularly in view of the fact that so short a period was to intervene between the date of publication and the date when the book was to become the accepted official standard. In view of the importance of these changes it may be well to call special attention to a number of them and they have, for this purpose, been incorporated in the appended table:

TABLE NO. 2.—SHOWING SOME OF THE MORE IMPORTANT CHANGES IN THE STRENGTH OF GALENICAL PREPARATIONS.

English Title.	Pharm. 1890. Per Cent.	Pharm. 1900. Per Cent.
Solution of Ferric Chloride	37·8	29
" " " Sulphate	28·7	36
" " Iron and Ammonium Acetate,	2·	4·
Opium, granulated	13–15	12–12·5
" powdered	13–15	12–12·5

Syrup of Ferrous Iodide	10	5
Tincture of Aconite	35	10
" " Belladonna Leaves	15	10
" " Cantharides	5	10
" " Capsicum	5	10
" " Colchicum Seed	15	10
" " Digitalis	15	10
" " Gelsemium	15	10
" " Hyoscyamus	15	10
" " Indian Cannabis	15	10
" " Lobelia	20	10
" " Nux Vomica	0·3 total alkaloids	0·1 strychnine
" " Opium	1·3– 1·5	1·20– 1·25
" " " deodorized	1·3– 1·5	1·20– 1·25
" " Physostigma	15	10
" " Rhubarb	10	20
" " Sanguinaria	15	10
" " Squill	15	10
" " Stramonium	15	10
" " Strophanthus	5	10
" " Veratrum	40	10

In connection with the changes made in the strength of the tinctures of potent drugs an explanatory note, similar to that included with tincture of aconite, tincture of strophanthus and tincture of veratrum, should also have been appended to tincture of capsicum and tincture of cantharides, the latter particularly, as it is now the most potent of all the official tinctures.

The addition of 2 per cent. of diluted hypophosphorous acid, to the syrup of ferrous iodide, is an unnecessary precaution and is particularly unfortunate in view of the fact that it introduces into this formula an additional ingredient not provided for in the provisions accepted by the International Conference at Brussels.

Additions and Dismissals.—The additions and dismissals, in connection with the publication of a new Pharmacopœia, may be variably regarded as an index of the care and scrutiny that has been exercised by the Committee of Revision in correctly interpreting the popularity, or lack of popularity, of the several substances that are brought before it for consideration; or, they may be regarded as an indication of the number of comparatively useless articles that are still included in the book itself.

Figures, while they offer but an uncertain basis for comparison, are usually interesting and it may therefore be permissible to in-

clude a comparative table showing the number of admissions and dismissals enumerated in the three recent editions of the U.S.P.

TABLE NO. 3.—SHOWING THE NUMBER OF ADDITIONS AND DISMISSALS IN THE EDITIONS OF THE U.S.P. FOR 1880, 1890 AND 1900.

	1880.	1890.	1900.
Additions	256	88	121
Dismissals	229	92	155
Total	485	180	276

That the members of the revision committees for 1880 and 1890 were more than usually careful in the consideration of their dismissals is evidenced by the fact that the present list of additions contains but three articles that were dismissed from these former editions. Of these articles, but one, extractum malti, dismissed from the Pharmacopœia for 1890, may properly be considered a desirable addition to the official materia medica. The other two, berberis and ceratum resinæ compositum, may safely be classed as being of doubtful utility. The latter particularly, popularly known as Deshler's Salve, while it has some local reputation in Philadelphia and its immediate vicinity as a household remedy, will find little or no use in the everyday practice of the modern surgeon.

Even a cursory review of the lists published in the new Pharmacopœia will suggest to the ordinary observer that the present Revision Committee has also been rather more careful with its dismissals than with its new additions, fully 30 per cent. of the latter being articles that are more or less limited in their uses. As an illustration of the rather liberal policy pursued by the committee it will suffice to call attention to the list of fluid extracts that are newly admitted; of the thirteen preparations included under this head it is safe to say that the fluid extract of cascara sagrada aromatic is practically the only one for which there was any real need, and here it is doubtful indeed if the committee has selected a formula that will give uniformly good results, or whether the preparations made according to this formula will be at all comparable to similar preparations put out by manufacturing pharmacists. Of the dismissals probably not more than three, or at most four, will be seriously missed. Potassa sulphurata might have been retained as it is not infrequently prescribed by dermatologists, in lotions, and being a substance that is not particu-

larly stable, some official limitation of the permissible decomposition would appear to be particularly desirable. Sodii carbonas is another substance for which there would appear to be little or no valid reasons for its dismissal; it is true the committee has offered us, as a substitute, sodii carbonas monohydras, but as this substitute appears to be quite unknown in the ordinary channels of trade, not even appearing in the price lists of manufacturing chemists, it would seem as though the committee might have contented itself by replacing sodii carbonas exsiccatus by the new title and retaining the well-known, though admittedly variable, sodii carbonas until such times as sodii carbonas monohydras had demonstrated its supposedly superior qualities.

At least one of the dismissals has considerable sentimental interest. For more than sixty years absinthium has practically served as the first stepping stone of the average apprentice into the interesting and fertile fields of pharmaceutical learning. In this connection it would be interesting, indeed, to know what a host of pleasant and in some cases, perhaps, unpleasant memories will be awakened by the dismissal of this one article. To many of the older men particularly it will appear as though another of the threads that binds the present with the past has been broken, and the question suggests itself, who is there that is willing and able to record the history, the romance and the varied memories that necessarily cluster about this singularly interesting though admittedly useless drug?

General Formulæ.—Paragraph 6 of the general principles to be followed in revising the Pharmacopœia, has already been referred to in another portion of this review. Unfortunately, perhaps, for the present-day pharmacist the instructions that were given the committee were not sufficiently specific, and the members of the committee probably thought it beyond their province to include general formulæ for preparations not included directly in the Pharmacopœia.

Some of the formulæ for galenical preparations that are included in this new Pharmacopœia would appear to indicate that the members of the Committee on Revision have lost faith in the ability, cunning and training of the average American pharmacist.

For more than half a century it has been the belief of the American pharmacist that he could, and actually did, make a very large number of extractive preparations by percolation that, in other countries, were usually made by maceration. The present revision

committee, recognizing the fallacy of this belief, have directed that a number of tinctures, formerly made by percolation, be now made by the older, more uncertain and less economical method of maceration and subsequent filtration. The Committee on Revision has gone even farther than this in connection with the official wines, and directs that four of the five wines of vegetable drugs be made from "fluidextracts," simple dilutions.

These are subjects, however, that should be, and probably will be considered at greater length at some future time, and are, in addition, not quite germane to the subject under consideration.

Suppositories.—Under this heading the revision committee gives a lengthy and in many respects excellent dissertation on the various kinds of suppositories in use, and the different materials used in their manufacture. In some particulars, however, the description is not quite in keeping with the facts.

When the committee asserts that suppositories "melt readily at blood heat," the assertion should have been qualified and made to apply only to that class of suppositories that do, or are intended to, melt at about that approximate temperature. Glycerin suppositories, for instance, do not and are not intended to melt at a low temperature.

In describing the method of making suppositories the committee speaks of fusion and of rolling by hand. As a matter of fact, by far the greater number of suppositories made and used in this country are made by cold compression in machines making from 1 to 300 suppositories at a time. As this process is not mentioned in this official description, it is fair to suppose that suppositories of this kind do not meet with the requirements of the Pharmacopœia, and should not be dispensed or used unless specified. The official weight of rectal suppositories, formerly 1 gramme, has been changed to 2 grammes, and the weight of glycerin suppositories is now a fraction more than 3 grammes, or little more than one-half the size of those formerly official.

Of the several preparations for which a general formula might very properly have been added to this pharmacopœia, the most popular are hypodermatic tablets. These preparations are now so extensively used, and the diluting powder used by different makers varies so greatly, that some restriction or at least suggestion as to the more desirable diluent, size and methods of making might well

have been included as a guide and for general information to physicians and pharmacists.

Powdered Drugs.—The motion, adopted on the second day of the Pharmacopœial Convention, "That the Committee on Revision be requested to consider the advisability of treating the subject of powdered drugs in the text of the Pharmacopœia," has received but indifferent attention, so that in this one particular at least, the present edition of the U.S.P. is decidedly behind the latest edition of the German Pharmacopœia, published more than five years ago.

This action is the more unfortunate as the practice of supplying ground and powdered drugs probably originated and is certainly more generally followed in this than in any other country in the world.

Standard Dropper.—Another motion, also considered on the second day of the Convention, recommending the adoption of a standard medicine dropper, was referred to the Committee on Revision without recommendations. In view of the fact that the International Conference for the Unification of Potent Medicaments adopted practically the same description for a dropper, and the same approximate equivalent for the size and weight of a drop of water, it does appear more than passing strange that the members of the Committee on Revision should have ignored the subject entirely.

Atomic Weights.—The decision of the committee to adopt the so-called didactic standard of atomic weights ($H = 1$) in place of the international or practical ($O = 16$) is to be deplored, particularly from the point of view of the pharmacist or the practical chemist, who can have little or no interest in the abstract principles involved in teaching the theory of chemical philosophy.

The practical reasons for adopting oxygen $= 16$ as the basis of the atomic weights in a work of this kind have been recounted in this JOURNAL so recently (AMER. JOUR. PHARM., 1902, pp. 153, 231) that there is but little necessity for going over this ground again.

A pharmacopœia is, or rather should be, above all a practical book for every-day work, and any feature that will in any way contribute to facilitate the necessary calculations connected with the estimation of the amount of a certain elementary body in any given combination, should be accepted without question. In addition to this, chemists who are actively engaged in industrial or analytical work the world over are using $O = 16$ as the basis of their calculations

The same is true of the pharmacopœias that have recently been published or are being prepared in Europe.

How much more closely the molecular weights of official substances, if based on an atomic weight of O = 16, would correspond to the molecular weights of the same substances as given in the pharmacopœias of 1880 and of 1890, is well shown by the appended table:

	U.S.P. 1880. H = 1 + O = 16.	1890. H = 1.	1900. H = 1.	G. P. 1900. O = 16.
Water	18	17·96	17·88	18·02
Sugar	342	341·2	339·6	342·22
Morphine sulphate . . .	758	756·38	752·83	758·54
Quinine sulphate	872	870·22	866·15	872·78
Strychnine sulphate	856	854·24	850 21	856.78
Salicin	286	285·33	283·99	286·18
Silver nitrate	169·7	169·55	168·69	169·97
Sodium phosphate . . .	358	357·32	355·61	358·35
Zinc sulphate	286·9	286·64	285·41	287·6

Specific Gravity and Solubility.—The adoption of 25° C. (77° F.) as the standard temperature at which the specific gravity as well as the solubility of the several chemical substances are to be determined and compared will undoubtedly meet with general approval, and is quite in keeping with a number of other practical advances that have been made in the chemistry of the new U.S.P.

This degree of temperature is so nearly the average of that maintained in habitations in temperate climates, that there should be little or no difficulty to obtain and maintain it, even with the limited amount of apparatus usually found in the average pharmacy. The adoption and use of this readily obtained degree of temperature should do much towards inducing pharmacists to apply many of the prescribed tests for the different official drugs and preparations, and thus make them familiar with the importance of specific gravity and solubility as an indication of the identity, purity and strength of many of the official substances.

Appendix.—This portion of the book can hardly be said to have been subjected to any radical changes, the bulk of the contained material and the manner of arranging the same being practically the same as that of the Pharmacopœia for 1890. A special table of contents has been added, and the whole section appears to have been carefully revised so as to bring it fully in harmony with the ad-

mittedly highly scientific character of the chemical portions of the new pharmacopœia.

A number of new reagents, test solutions and volumetric solutions have been added, and several of the more obsolete or less useful tests have been omitted. Numerically, the present Pharmacopœia has sixteen more tests and reagents and four more volumetric solutions than were included in the Pharmacopœia for 1890, which contained a total of 135.

Among the innovations in this portion of the book is a time-limit test for heavy metals. "To detect the presence of poisonous or undesirable metallic impurities in official chemical substances or their solutions." The test is designed to detect objectionable quantities of antimony, arsenic, cadmium, copper, iron, lead and zinc, and is referred to repeatedly in the text of the Pharmacopœia as an indication of the permissible limitations of these substances.

The appended tables have been carefully revised, so as to bring them up to date and fully in harmony with the changes that have been made in the text-book itself. One additional table, a table of weight and volume relations, has been added.

The index, which is also considered as a portion of this appendix, consists of forty-four double-column pages, and contains upwards of 3,500 references. The popular synonyms that appeared as an integral part of the description of the several official articles in previous editions of the Pharmacopœia, have been relegated to the index, where they appear as cross references, being printed in small type under the official Latin titles, and in the ordinary type in their alphabetical order, followed by the official Latin title.

The Problems Before Us.—For the final publication of the new Pharmacopœia, and for all material advances that have been made in connection with it, we are indebted to the members of the Committee on Revision. They, individually and collectively, have devoted to the work a considerable amount of time, thought and labor for which they will not, and, in fact, could not, be adequately recompensed by any profits that can possibly accrue from the use or sale of the book.

That the eighth revision of the Pharmacopœia of the United States of America will be the most popular and most widely used of all the editions of the book so far published, is to be expected, and is in a measure assured by the increasing sale, use and popularity of the U.S.P. in recent decades.

The recognition that the present edition of the U.S.P. will receive, and the influence that it will have among medical practitioners, will depend largely on how the pharmacists of the country demonstrate their ability to interpret the descriptions, the formulas and the directions that are embodied in it.

That the time that has elapsed between the meeting of the National Convention in 1900, and the final publication of the Pharmacopœia in 1905, has been so long, is unfortunate, and is probably due to a series of unforeseen circumstances that could not have been properly provided for by the National Convention itself. For the apparent undue haste, however, with which the present Pharmacopœia is expected to be put into use, as the official authority, after its final publication, the National Convention must share the responsibility and the blame with the members of the Board of Trustees. It is true that the National Convention resolved that the date when the new Pharmacopœia is intended to go into effect should be reasonably distant from the actual date of publication, but the wording of this resolution was so indefinite, that, in view of the long period of time that has elapsed since the present revision of the Pharmacopœia was commenced, the members of the Board of Trustees should not be too severely criticized for appearing to be over-anxious to get this, their first venture in the publication line, before the medical and pharmaceutical professions.

A repetition of this rather unfortunate combination of circumstances might, and properly should, be guarded against at the next decennial meeting of the United States Pharmacopœial Convention, in 1910, by outlining more clearly the general principles to be followed in revising the Pharmacopœia and by fixing on a definite date, at least four or six months after the actual publication of the book, when the same shall become authoritative and official.

The time that is usually required to prepare the revision of the Pharmacopœia for the press could, and certainly should, be materially reduced if pharmacists, and others who are interested, would liberally criticise the book before the meeting of the National Convention so as to allow the Committee on Revision and the representatives of accredited societies to present definite and acceptable outlines for revising not alone the general principles that are involved but also such of the official formulas and descriptions as may be found faulty or incorrect.

The scope of the Pharmacopœia could very well be still more restricted and be made to include only such drugs and preparations as are generally used in different sections of the country. In addition to this general formulas, or descriptions of classes of preparations, should be introduced and be made to provide for a host of preparations not necessarily carried as an integral part of the Pharmacopœia itself.

For that large, and constantly growing, class of substances that goes to make up the universal, or common, stock of medicines we should have a due and proper consideration for the usages in other countries and endeavor to adjust our descriptions in such a way that they will coincide as much as possible with similar descriptions in other National Pharmacopœias.

This principle, a due regard for the uses and practices in other countries, is known to have been recognized by the National Convention that met in Washington, in 1850, and is commented on favorably in the preface to the Pharmacopœia for that year.

Since then, however, man, through his knowledge and application of the practical sciences, has been able to annihilate time and space to such an extent that important happenings in distant parts of the world may, in point of time, be announced to us before they occur.

The progress that has been made in this direction has had a very marked influence in eliminating local, and even national, ideas and customs, and has practically done away with the clannishness and conservatism that formerly distinguished and effectually segregated the different nations of Europe. This same spirit of progressiveness has also had a marked effect on the science of medicine; and the practice of pharmacy, particulary, has undergone changes but little dreamed of half a century ago.

So far, neither these changes themselves, nor the spirit of progressiveness that has brought them about, are as fully or as truthfully reflected in our National Pharmacopœia as they should be, and it remains for us to say whether or not they are to be more clearly portrayed in the next revision.

In this connection it must be remembered that the pharmacists of this country, individually and collectively, are responsible for the shortcomings, errors, ambiguities and faults of the Pharmacopœia unless they are in a position to point out to the present and to the succeeding Committee on Revision why and how corrections are to

be made, and where and how the book itself may be improved so as to make it, as it rightfully should be, the accepted and acknowledged authority on all matters pertaining to drugs and preparations that are generally accepted and widely used in the treatment of disease.

ALKALOIDAL ESTIMATIONS IN THE UNITED STATES PHARMACOPŒIA, EIGHTH REVISION.

By W. A. Puckner.

The United States Pharmacopœia of 1890 prescribed standards for three alkaloid bearing drugs, cinchona, nux vomica and opium, and for six preparations therefrom, namely, extract, fluid extract and tincture of nux vomica, and extract, tincture and deodorized tincture of opium. The eighth decennial revision of the United States Pharmacopœia directs alkaloidal estimations for twenty-one drugs: aconite, belladonna leaves, belladonna root, cinchona, red cinchona, coca, colchicum seed, conium, guarana, hydrastis, hyoscyamus, ipecac, nux vomica, opium, deodorized opium, granulated opium, physostigma, pilocarpus, scopola and stramonium. Further, the estimation of alkaloid in thirty-four preparations of these drugs is directed; namely, belladonna plaster, extracts of belladonna leaves, colchicum corm, hyoscyamus, nux vomica, opium, physostigma, scopola and stramonium, fluid extracts of aconite, belladonna root, cinchona, coca, colchicum seed, conium, guarana, hydrastis, hyoscyamus, nux vomica, opium, deodorized opium, physostigma and stramonium. Truly, a victory for the advocates of alkaloidal assays! The advanced position which the revision committee has taken in respect to standardization of alkaloidal drugs and their preparations is shown by a glance at the German Pharmacopœia, which went into effect January 1, 1901, and the British Pharmacopœia of 1898. The latter directs the valuation of the preparations of belladonna, cinchona, ipecac, nux vomica and opium only, twelve altogether. It requires but two drugs, red cinchona bark and opium, to be assayed; evidently considering such assays superfluous when the preparations of the drugs, the form in which they are administered, must be assayed when finished. The German Pharmacopœia prescribes methods of valuation for six drugs, aconite, cinchona, ipecac, nux vomica, opium and pomegranate, and for the prepara-

tions of belladonna, cinchona, hydrastis, hyoscyamus, nux vomica and opium—ten altogether.

The advanced position taken by the revisors of the Pharmacopœia is also shown by the nature of the standards adopted. While our Pharmacopœia of 1890 and the present German Pharmacopœia direct the determination of total alkaloids of nux vomica, the new revision of the Pharmacopœia, also the British Pharmacopœia, separates brucine from strychnine and estimates the strychnine only. When assaying opium the purity of the precipitated morphine must be proven. While the British Pharmacopœia directs the estimation of total alkaloids in ipecac the new book uses a method which rejects the inert psychotrine. Similarly an attempt is made to estimate, not total alkaloids, but cocaine in coca.

As is well known, the amount of alkaloid in a given drug is subject to wide variations, depending on the conditions under which it was grown, when collected, etc., and the means to be adopted to obtain a drug preparation of definite strength has been a frequent subject of discussion. It is often asked whether, to obtain a fluid extract of a certain alkaloidal content, must a drug of such strength be used so that 100 grammes will yield 100 c.c. of a fluid extract of the correct strength? Or may weak and strong drug be mixed in such proportions that 100 grammes of the mixture will yield 100 c.c. of a fluid extract of the correct strength? Or may drug of any strength be used and the volume of the finished fluid extract adjusted accordingly? Similarly, in the preparation of solid extracts it is asked whether an extract above the desired strength may be reduced with a weaker extract? Or may inert matter be used as diluent? And, if so, what diluent shall be used? Or if extract of nux vomica should be deficient in alkaloid, may perhaps it be fortified with strychnine? Generally, the U.S.P., eighth edition, requires drugs, when assayed by the process given, shall yield "not less than" a given per cent. of alkaloid, and the preparation obtained therefrom shall, if "found by the assay to contain more than" the required percentage of alkaloid, be diluted to a definite strength. For fluid extracts menstruum such as was used for the percolation is usually directed as the diluent, and for extracts, dry as well as those of pilular consistence, sugar of milk is directed. Generally, as stated before, the preparations of drugs are directed to be adjusted to a definite standard; thus extract of nux vomica must contain 0·5

per cent. strychnine, extract of opium 20 per cent. of morphine, fluid extract of nux vomica 1 gramme strychnine in 100 c.c. An exception is tincture of opium, which "should contain in 100 c.c. not less than 1·2 nor more than 1·25 grammes" of morphine. For tinctures no directions for diluting to a definite standard are given, they being required to contain "not less than" a stated amount of alkaloid; exceptions to this are tinctures of aconite and belladonna leaves, which are to be adjusted to a definite standard. No authority is given for concentrating preparations if they, on assay, are found below standard, and, since a minimum standard is prescribed for the crude drug, this condition need perhaps not arise. But if coca leaves assaying 0·4 per cent. are on hand, what disposition is to be made of them? If mixed with an equal bulk of leaves assaying 0·6 per cent., may this mixture be considered to be coca U.S.P.? Since with opium the mixing of weaker and stronger drug in proper proportions is specifically directed, and since no such directions are given for any other drug, does this mean that this procedure may be used with opium only?

As was natural, the Keller method of assay, with few exceptions, was adopted for the assay of crude drugs. For belladonna leaves, belladonna root, coca, hyoscyamus, scopola and stramonium, the writer's modification of the Keller method (*Pharm. Rev.*, 1898, 16, p. 180), which avoids the use of aliquot parts, was adopted. For aconite the method of A. B. Stevens (*Pharm. Arch.*, 1902, 6, p. 49; Proc. A. Ph. A., 51, 776), in which the drug is extracted with 70 per cent. alcohol, was adopted. For pilocarpus the method of A. B. Lyons (Proc. A. Ph. A., 1903, 51, p. 254), in which the drug is percolated with chloroform in the presence of ammonia and where also aliquot parts are avoided, is given.

For fluid extracts quite a variety of methods were adopted. Fluid extract of aconite is, of course, assayed by the Stevens method. Fluid extracts of belladonna leaves, hyoscyamus, scopola and stramonium are to be assayed by the method suggested by the writer (*Pharm. Rev.*, 1898, 16, p. 303), in which the fluid extract is diluted with water, made alkaline with ammonia water and extracted with chloroform without having previously expelled the alcohol contained in the fluid extract. When assaying fluid extract of coca the same method is used, except that ether is substituted for chloroform. Fluid extracts of ipecac and nux vomica are illustrations where the

alcohol is expelled before the liquid is transferred to the separator for extraction. In fluid extract of colchicum seed and fluid extract conium the liquid is evaporated to dryness with sand, and then the Keller assay method applied. While in the assay of hydrastis the insolubility of berberine in ether is depended on to separate hydrastine from berberine, when the fluid extract is assayed the berberine is precipitated and removed as the iodide, as recommended by Gordin and Prescott (AM. J. PHARM., 1899, 71, p. 257).

The methods for the assay of tinctures and extracts are generally adapted from those prescribed for the corresponding fluid extracts. Thus extract of belladonna leaves is dissolved in a mixture of water, alcohol and ammonia water, and then treated as directed for the fluid extract, while extract of physostigma is digested with a little dilute alcohol, then brought to dryness with sand and assayed.

When the alkaloidal residue obtained in the assay is to be titrated, generally hematoxylin is to be used as indicator, even when titrating ipecac alkaloids. In some cases iodeosin is given as an alternate; in nux vomica it is specified.

Caffeine, colchicine, hydrastine and morphine are determined by weighing the free base, the purity of morphine being checked by its solubility in lime water. Conine is weighed as conine chloride.

When stramonium leaves or its preparations are submitted to assay the alkaloidal content is calculated from the amount of acid required for the neutralization of the extracted alkaloids; but this assay tells practically nothing about the identity of the alkaloids. As far as the assay is concerned, fluid extract of coca might be substituted for stramonium leaves or a worthless lot of hyoscyamus might be brought up to standard by the admixture of very little belladonna leaves. While such substitution has been detected in commercial products, as, for instance, in sheep dips, sold on their nicotine content, which have been found adulterated with pyridine (J. A. Emery, *J. Am. Chem. Soc.*, 1904, **26**, p. 1113), no similar adulteration has to my knowledge been reported for medicinal substances. Although not requiring an identification as well as an estimation of the alkaloid of drugs, as does the German Pharmacopœia, in some cases the U.S.P. standards in a way do define the identity of the alkaloids; thus hydrastis is required to contain not less than 2·5 per cent. of *hydrastine*, belladonna leaves shall yield not less than 0·35 per cent. of *mydriatic* alkaloids, fluid extract of

belladonna root must contain 0·5 grammes of *mydriatic* alkaloids *from belladonna root*, and fluid extract of guarana must contain in 100 c.c. 3·5 grammes of the *alkaloids from guarana*.

Finally, the retention of H=1 standard of atomic weights should here be noted, since it is liable to be of some annoyance in alkaloidal estimations. Thus, while with this standard the molecular weight of aconitine, $C_{34}H_{47}O_{11}N$, is 640·55, it is 645·42 when the now generally adopted standard, O = 16, is used to calculate the molecular weight, and an inadvertent substitution of one for the other may introduce an error of nearly 1 per cent. in a volumetric estimation of aconitine.

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PROFESSOR HORATIO C. WOOD.

BY HENRY BEATES, JR.

Prof. Horatio C. Wood, the President of the U. S. Pharmacopœial Convention, is a physician of distinguished and scientific merit, as well as a naturalist of world-wide fame. He was born in Philadelphia, Pa., January 13, 1841. He is a descendant of Richard Wood, who emigrated from Bristol, England, in 1682, and settled first in Philadelphia, and later in New Jersey. His genealogy on his father's side in America, arranged in generations, is Richard Wood, James Wood and Jane Wood, Richard Wood and Priscilla Bacon Wood, Richard Wood and Hannah Davis Wood, Richard Wood and Elizabeth Bacon Wood, Horatio Curtis Wood and Elizabeth Bacon Wood.

On the mother's side he is believed to be descended from Samuel Bacon, who, in 1685, purchased lands on the Cohansey River, Cumberland County, N. J., from the Indian sachems. Samuel Bacon is the reputed son of Nathaniel Bacon, who was a member of the Long Parliament, and banished under Charles II. This Nathaniel Bacon was the son of Sir Nathaniel Bacon, a brother of Sir Thomas Bacon and grandson of Sir Nicholas Bacon, Lord Keeper to Queen Elizabeth. Through Hannah Davis the strain of blood is traceable to a brother of Robert Bruce, of Scotland.

Professor Wood was educated at Westtown Boarding School, and the Friends' Select School of Philadelphia, both sectarian insti-

H. C. WOOD, M.D.,
President U. S. Pharmacopœial Convention, 1900.

tutions, and graduated by the Medical Department of the University of Pennsylvania in the class of 1862.

Before entering medicine his fondness for natural history found him a worker in the Academy of Natural Sciences of Philadelphia. He there distinguished himself by his original work. His first original paper, "Contributions to the Carboniferous Flora of the United States," appeared in the proceedings of the Academy when he was but nineteen years old.

After obtaining the doctorate, he at once became a resident physician of the Philadelphia Hospital, and, a year later, occupied a similar post in the Pennsylvania Hospital.

He entered upon private practice in 1865, and directed his energies especially to materia medica and the art of therapeutics. During these years he continued his studies in natural history and published numerous valuable papers. His work in "cell botany" was noted, and of his many important papers one on the "Fresh-Water Algæ of North America" was published in the "Smithsonian" of 1872, with nineteen colored and two uncolored plates, and 360 original microscopical drawings. Thirteen original memoirs on entomological subjects contribute to his fame.

After 1873 he devoted his talents entirely to medicine. He occupied the Chair of Botany on the Auxiliary Faculty of Medicine of the University of Pennsylvania in 1866. He filled this chair, which had been established and endowed by his famous uncle, Prof. Geo. B. Wood, for ten years with distinguished merit. He devoted several years to the especial study of diseases of the nervous system, and was made clinical lecturer on this subject when, in 1894, the new University Hospital was organized.

The following year he was appointed Professor of Diseases of the Nervous System. As editor of *New Remedies*, 1871–73, and of the Philadelphia *Medical Times*, 1873–83; of the *Therapeutic Gazette*, 1884–90; and as sole editor of the latter half of the fourteenth edition of the United States Dispensatory, he served medical journalism with meritorious success. His co-operation in the revision of the fifteenth to eighteenth editions of the United States Dispensatory, with Profs. Joseph P. Remington and Samuel P. Sadtler, is well known.

His "Investigation of Thermic Fever or Sunstroke," 1892; "Studies n the Physiology of Fever"; his world-wide-used text and reference

book on "Materia Medica, Theapeutics and Toxicology," first edition, 1874; twelfth, 1905—are monuments to his learning and skill, and have served as most potent factors in evolving that type of modern thought so well termed rational medicine. Indeed, his influence for rational medicine classifies him as a pioneer.

His prize essay on "Thermic Fever or Sunstroke," in 1872; the brochure on "Brain Work and Overwork," in 1880; his text-book on "Nervous Diseases and Their Diagnosis," 1887; "Syphilis of the Nervous System," 1889; "The Practice of Medicine," in connection with Prof. R. H. Fitz, of Harvard, in 1896, compose the more widely used of his published works.

Miscellaneous papers have been published by the Smithsonian Institute, the American Philosophical Society, the Academy of Natural Sciences of Philadelphia, Essex Institute of Salem, Mass., as well as by the various leading technical, scientific and medical journals of America, England and Germany. These comprise twenty-six original botanical and entomological papers and 240 original articles on experimental pathology, physiology, therapeutics and clinical and legal medicine.

Under the auspices of the Medical Alumni of Harvard University he delivered a special course of lectures on Therapeutics in that institution in 1893. In 1890 he was honored with delivering the address for America before the International Medical Congress in Berlin, Germany. He represented America again at the International Pharmacopœial Convention at Brussels, Belgium, in 1902.

He served his country during the War of the Rebellion as Acting Assistant Surgeon in Washington, Virginia and Philadelphia. As consulting neurologist he has been connected with the Philadelphia, Episcopal, University and Burn Brae Hospitals. He has won several prizes offered for scientific research, requiring ability of the highest order, and has been the recipient of honorary degrees by several of our most renowned institutions of learning.

Many scientific societies, including the National Academy of Science, are honored by his membership. The College of Physicians and Surgeons of Philadelphia in 1902 and 1903 accorded him their highest gift, the presidency.

This partial sketch of one of Philadelphia's most indefatigable and distinguished scientists would be incomplete were reference not had to his personality or character. Always exemplary of the highest

ideals, he is thorough as an investigator, and demands of his students accuracy of work in the acquisition of knowledge. Exacting, he is ever courteous and considerate, and those who have profited from his teachings and enjoyed the privilege of his learned discourses hold in grateful remembrance him whom they respect and regard with high esteem.

His influence for strength of character; for unceasing endeavor to better and progress; for devotion to truth and the welfare of fellow man; for doing unto others as he would be done by; explain why the profession it has been his life-work to serve, has honored him with well-merited tributes of the highest confidences, trust and respect. Truly, of Wood it can be said, the world is the better for his having lived.

BIOGRAPHY OF PROF. JOSEPH P. REMINGTON.

By Chas. H. LaWall.

Equipped by nature with a rare combination of qualities of a high order, Prof. Joseph P. Remington, chairman of the Committee of Revision of the United States Pharmacopœia, is to-day unquestionably the foremost figure in American pharmacy. A profound student of human nature, a discriminating patron of art and literature, possessed of a wide fund of scientific knowledge and a man of rarely winning personality, he is the possessor of many other admirable qualities which endear him to his friends and compel the respect of those who differ from him.

Prof. Joseph P. Remington was born in Philadelphia on the 26th of March, 1847. His father was Dr. Isaac Remington, a well-known Philadelphia physician, and his mother was the daughter of John Hart, who was the descendant of Townsend Speakman, one of the earliest Philadelphia apothecaries. Professor Remington's ancestors on both sides of the family have been residents of Philadelphia for three generations, and all of them have been members of the Society of Friends.

From both his maternal and paternal ancestry Professor Remington inherited a liking for science, particularly in the direction of chemistry, and at an early age he equipped a small laboratory, where he carried out many experiments, and at this early period he constructed much of his own apparatus, being of a mechanical turn

of mind. At the age of fifteen he suffered the loss of his father, whose death at this time compelled him to change his plans regarding his education. There was no doubt as to the line of work for which he was best adapted, although many of his friends and relatives at that time wished him to take up his father's profession and become a physician. In this discussion he had his own way, and he was allowed to begin the study of pharmacy, his argument being that the best way to become a good physician was first to become a good pharmacist. He thus gained his point, and while medicine may have lost a shining light, pharmacy has acquired a new constellation, in which he is the central moving force.

On January 1, 1863, Joseph P. Remington began his apprenticeship whereby he was to learn the art and mystery of the apothecary business. The store selected was that of Charles Ellis, Son & Co., the selection being made by Mr. Henry M. Troth, the son of Henry Troth, who played such a prominent part in the early affairs of the Philadelphia College of Pharmacy. Mr. Troth was the brother-in-law of Professor Remington, and it was through him that Charles Ellis, the head of the firm, who was at that time the president of the Philadelphia College of Pharmacy, took more than ordinary interest in the young apprentice. In those days the apprenticeship to the drug business did not consist in selling postage stamps and serving soda-water, and the business of Charles Ellis, Son & Co. at that time embraced an unusually wide range of work, including the spreading of adhesive plasters and the manufacture of many pharmaceutical preparations on a large scale.

During his term of apprenticeship Prof. Remington attended the lectures at the Philadelphia College of Pharmacy, and the degree of Graduate in Pharmacy was conferred upon him at the Commencement of the College held in 1866. On January 1, 1867, Professor Remington entered the service of Dr. E. R. Squibb, who was probably the most painstaking and conscientious member of the pharmaceutical profession in this country. Professor Remington entered Dr. Squibb's family and made his home with them for nearly three years; during which time he acquired a practical knowledge of analytical and manufacturing work, which was rendered doubly valuable by the daily discussions with his preceptor, and the interest which Dr. Squibb took in his pupil. Professor Remington's special duties during the latter part of this period embraced the manufacture of chemical salts,

spirit of nitrous ether, oil of wine, purification of chloroform and the manufacture of ether for anæsthetic purposes, the latter process being one in which Dr. Squibb took especial pride, the product being made of the highest possible quality in an apparatus of his own devising.

The death of Professor Remington's mother at this period necessitated his return to Philadelphia, where he entered the employ of Powers & Weightman, with whom he continued until 1872, when he purchased the retail pharmacy at the northeast corner of Thirteenth and Walnut Streets. Here he continued in business for a period of thirteen years, during which time he showed himself to be equipped with practical business qualities seldom seen in combination with the high degree of professional knowledge of which he was the possessor.

His active participation in the affairs of the Philadelphia College of Pharmacy commenced in 1871, when he was invited to become the assistant to Prof. Edward Parrish, who then occupied the chair of Pharmacy in that institution. After the death of Professor Parrish, in 1872, Professor Procter, who was reinstated to the position of Professor of Pharmacy, which he had formerly occupied, retained Professor Remington as his assistant. These pleasant relations continued until the death of Professor Procter, in 1874, Professor Remington being elected in March of that year to the full Professorship in Pharmacy. His progressive spirit and his sincere love for his *Alma Mater* has led him to constantly exert his efforts toward increasing the equipment and raising the standard of education in the institution with which he has ever since been associated. It was through his instrumentality that the method of practical instruction in pharmacy was inaugurated and brought to its present high degree of efficiency.

Professor Remington's service in the American Pharmaceutical Association, of which body he became a member in 1868, has been varied and continuous. He has been the chairman of numerous important committees, among which may be mentioned the Committee on the Centennial Exhibition in 1876, at which time he played a very important part in local pharmaceutical affairs owing to his high professional standing, both as a teacher and as a practical pharmacist. In 1892 he was elected to the presidency of the American Pharmaceutical Association, and he presided over probably the

most important meeting in the history of that association—the one held in Chicago during the World's Fair in 1893, during which time there was also an important international pharmaceutical conference, over which he also presided. During his many years of membership in this association his numerous contributions of papers to the annual meetings have been valuable and interesting.

In 1878 Professor Remingtom aided in organizing the Pennsylvania Pharmaceutical Association. During the many years since that time Professor Remington has rarely missed a meeting of that association, as he has constantly been actively interested in all subjects pertaining to the advancement of pharmacy. He was elected to the presidency of the Pennsylvania State Association in 1896, and it was largely through his active efforts during President Hay's term of office in 1903 that the Pennsylvania Pharmaceutical Association added 500 new members by special organized effort of an auxiliary committee on membership of which Professor Remington was the chairman.

Professor Remington's high order of ability as a diplomat has frequently led to his appointment as a delegate to the various medical associations, and it is largely through his instrumentality that the most cordial relations have always existed between the organizations of these two great professions.

Professor Remington's contributions to the literature of pharmacy have not been confined to the writing of papers, but he is the author of one of the best-known text-books of pharmacy in the world, the "Practice of Pharmacy," first issued in 1885, and used at present in every college of pharmacy in America, besides being widely and favorably known abroad, and the fourth edition of which is now in preparation. He has also been an associate editor of the United States Dispensatory since 1879. During the period of his connection with that important work of reference, four editions have been issued, each of which has been successful in the highest degree. In 1897 he became the pharmaceutical editor of "Lippincott's Medical Dictionary," a standard work of reference.

From his prominence in association matters, Professor Remington has naturally been looked to for assistance in all matters pertaining to pharmaceutical legislation. That he has been a willing and able worker in this direction is attested by the fact that he was a prime mover in the efforts to have the college diplomas recognized by the

PROFESSOR JOSEPH P. REMINGTON,
Chairman U. S. Pharmacopœial Revision Committee, 1900.

various State authorities, and when the time became ripe for prerequisite legislation he was one of the hardest workers in securing the passage of the prerequisite amendment to the Pharmacy Law in the State of Pennsylvania in the Spring of 1905.

In 1886–7 Professor Remington was elected a Fellow of the Chemical, of the Linnean, and of the Royal Microscopical Societies of Great Britain. He has been a recipient of the honorary degree of Master in Pharmacy (Ph.M.) of the Philadelphia College of Pharmacy, and that of Doctor of Pharmacy (Phar.D.) from the Northwestern University of Chicago. He is an honorary member of the College of Pharmacy of the City of New York, and of the State Pharmaceutical Associations of New York, New Jersey, New Hampshire, Nebraska, Ohio, Colorado, Virginia, Georgia and others. He is a member of The American Philosophical Society, The American Chemical Society, The American Geographical Society, a life member of the Academy of Natural Sciences of Philadelphia, and of the Historical Society of Pennsylvania. He was appointed to represent the United States at the Eighth International Pharmaceutical Congress, held at Brussels in 1896; was a delegate to the Pan-American Medical Congress in 1893; also to the second Congress in Mexico in 1896. He holds honorable membership in the Pharmaceutical Society of Great Britain, the British Pharmaceutical Conference, Pharmaceutische Gesellschaft zu St. Petersburg, Instituto Medico Nacional, Mexico; Société de Pharmacie d'Anvers, Société Royale de Pharmacie de Bruxelles. He also holds membership in the Art Club, the Society of American Authors, the Franklin Inn Club, and the Church Club, all of Philadelphia.

Professor Remington's connection with the United States Pharmacopœia commenced in 1877, when he was appointed to serve on an auxiliary Committee of Revision appointed by the Philadelphia College of Pharmacy. The following year the same institution appointed him as a delegate to the National Convention for revising the Pharmacopœia, which body met in Washington, D. C., in 1880. The report of the committee from the Philadelphia College of Pharmacy was of such great value to the Revision Committee that he was elected a member of the final revising committee and chosen first vice-chairman of that body. In 1890 he was again sent as a delegate by the Philadelphia College of Pharmacy to the National Convention which met in Washington, and was again elected to the

position of first vice-chairman of the final Committee of Revision, and it was while serving in this capacity that the lamented death of Charles Rice, Chairman of the National Revision Committee, occurred on May 13, 1901. Although elected first vice-chairman for the purpose of succeeding to the chairmanship, Professor Remington felt that such an important position should not be filled by succession and, after serving a short time until the office was in running order, he asked for a special election to fill the position of chairman, for the enormous amount of time and labor which this position demands was not wholly at his disposal. Of the twenty-six members of the Committee of Revision, twenty-two voted for the election of Professor Remington, and he felt that, under the circumstances, it was his duty to accept.

The eighth decennial revision of the United States Pharmacopœia has been accomplished under great difficulties. An unusual number of deaths occurred in the committee. The chairman of the Committee of Revision and the chairman of the Board of Trustees of the Pharmacopœia, both died in office, and four other members passed away.

Professor Remington's summer months are spent at his seaside home in Longport, N. J., where much of the work of Pharmacopœial revision has been carried on under his immediate supervision and active participation. His judicious system of combining both business and pleasure in the proper proportions has enabled him to accomplish a wonderful amount of work without losing the buoyancy of manner and cheerfulness of disposition which have always been characteristic of him, and which have won him the friendship of all who have been fortunate enough to be associated with him. One of his most prominent characteristics, and the one to which his success may be largely attributed, is his wonderful painstaking attention to the minute details of whatever work occupies his attention for the moment. This is due to his remarkable power of concentration upon the subject at hand, which often enables him to do more than double the amount of work upon any subject than is done by the ordinary worker in a given time, and his insistence upon the same intensity of purpose in those who are associated with him in any undertaking, marks his ability as a leader of no ordinary calibre.

Professor Remington is a fluent and forceful speaker upon any subject pertaining to his professional work, and his ability as a

teacher is recognized by the thousands who have benefited by the instruction which he has so conscientiously given for nearly thirty-five years. Indeed he may be said to be a teacher of teachers, for most of the successul Professors of Pharmacy in America to-day have been pupils of his at some time during their careers.

As an extemporaneous speaker he has few equals in professional life, his ready fund of apt illustrations and his keen wit rendering him almost incomparable in this respect.

STRUCTURAL PLANT RELATIONSHIPS.[1]

By John Uri Lloyd, Ph.D., Ph.M.

Their Record.—Among the earliest remedial agents, as well as the most useful remedies of the present, are plant products and plant agents. From the dawn of the study of medicine to the threshold of the nineteenth century, the most conspicuous of all remedies have been those formulated under the influence of vegetable life. The simples of the aborigines of all climes and lands, the remedies of domestic medicine, as well as those of empiricism past and present, the agents that science most values and most studies, have been and yet are plant structures. Every country of the globe contributes thereto. Every people of the earth partakes thereof. The pharmacopœia of every country, the materia medica of all the schools in medicine past and present, give their best care to the remedial action of vegetable structures. These have ever been the established, the cherished remedies of all nations, and are no more to be displaced by artificial preparations from outside, than are vegetable foods to be replaced by synthetics evolved by the chemist.

Let us not neglect to credit the value of inorganics in life conservation. No man will deny the value of minute amounts of sodium and potassium compounds, of chlorine salts, of earths, of minerals in foods. Nor will he, if he thinks, undervalue the rational use of such in medicine, where either alone, or as integral parts of plant structures, they serve well their part. But as no reflecting man will presume to restrict his foods wholly to these unorganized substances, so no balanced mind, informed concerning the record of remedial

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[1] Read at the meeting of the National Eclectic Medical Association, St. Louis, 1904, and contributed by the author.

agents of the past, and their qualities at present, will deny the supremacy of vegetable *structures* as corrective agents in the hands of men qualified to use them intelligently.

The life of man and the health of man depend on the conservation of energy held in the life forces that are locked in vegetable structures, be they called food or remedy.[1]

Empiricism in Food and Remedy Studies.—As the natural foods of man are empirical (established by experimentation) so are the most useful plant remedies the result of empiricism. Lost in the past are the experiments that led man to know that wheat is a food, and the same is true of most fruits. The wanderings which give us our known foods and medicines are not less tortuous than the painful creeping of the human family from out savagery into civilization. But they are more obscure, because in the main the journey commenced before man presumed to record any data whatever. It antedated the records of lost civilizations, and came down much after the manner in which a robin teaches its young to eat a worm. Who can tell the number of lives lost in the experimentation that finally led to the separating of the poison that exists in the tapioca plant from the wholesome starch food known as tapioca? Who knows the number of deaths preliminary to man's differentiating between the poisonous and the edible fungi, which is yet a problem, for in this field deaths often occur? The story of how the acrid arums came to be utilized by primitive people so as to become foods, or of the discovery of the distinction between the edible fish and flesh and forms of flesh and fish unwholesome, is as obscure as the experiments that led to the utilization of innocuous weeds as foods. Somewhere in Nature's climes all food plants are, or once were, weeds. To find their value as nutrients demands experiment which establishes some as useful when *they* become known as foods. So recent comparatively, is the sad proving of the attempt to eat as a pot herb one of America's new plants, as to have fixed the term *Jamestown Weed* to the plant which the settlers of Virginia about Jamestown investigated to their sorrow and death. Man's search for food is a

[1] Do not infer that the author overlooks or condemns *animal* foods. This paper will not permit a consideration of that phase, but it may be briefly said that the use of animal food is but the utilizing of vital force that has been transferred to flesh from plants that the animal has eaten. Plant life is the great food storehouse of both carnivorous and herbivorous animals.

story still in process. There is yet a risk in some directions where persons uninformed partake of weeds that should be known as poisons. In England the "sow-bread" or bryonia claims each year its victims. The same is true of *Œnanthe crocata.* The wild parsnip is often eaten in America for parsnip, and death results. The terribly poisonous amanita is mistaken for the wholesome mushroom. Whole families sometimes perish; no antidote is known. And yet the weeds of the field, the plants of the desert and the forest, unquestionably offer untold food opportunities to the human family. Let us not forget that the luscious apple came from a knotty, astringent wild fruit, that the mother of the potato grows yet as an insignificant wild tuber in Mexico, and that but a generation back the tomato was considered poisonous and was cultivated merely as an ornamental plant.

Turn now to remedial plants. Who can even formulate the empirical wanderings that led to the discovery of the qualities of ipecac, nux vomica, opium, jalap, podophyllum, that are possessed of energies that may, if illogically used, make them poisons, or, if discreetly employed, yield kindly remedial agents? Who can trace the more difficult study that led to the discovery of the insidious, valuable qualities of less harsh agents, such as baptisia, aletris, hydrastis, collinsonia, macrotys, and that last valuable discovery of the past decade, echinacea, which but a few years ago was known only as a worthless Western weed? Who will next serve humanity in this field, or who can predict the name of the plant next to unfold its qualities? All that have been introduced are as yet empirical gifts to man in the sense that all these natural corrective agents have been established experimentally. The good of those yet to come must as surely be the result of empiricism. All that nourishes and conserves life, all that upbuilds structures and modifies the life current or prevents the abnormal destruction of tissue, reasoning from analogy and from rational thought has been the result of empirical gifts to mankind. The evolution was based on *experimentation* which leads to faith in that which has been evolved in the past mazes of a struggle for existence wherein as a rule no book record is preserved. The data of it all is lost.

The Natural Structure of Foods and Alteratives.—Among primitive lessons in food study is that of selection and differentiation between *parts* of natural bodies, be they vegetable or animal. Men do

not eat the thorn of the cactus or the root of the mandrake, but the fruit or juice of the one, and the fruit of the other. They do not eat the husk of corn or the shell of the almond, but their kernels. This is a familiar fact, seemingly self-evident, but some time in the past it too had to be learned by experiment. The tuber of the potato is food, not its top. Phytolacca sprouts are excellent greens, but the root is an acrid irritant. The flesh of the fruit that encloses the deadly nux vomica seeds, much as an orange seed is imbedded in its pulp, is eaten freely. All this has experience taught, and were it not for the personal instruction each man gets from those already informed, would, in each case, have to be learned anew.

Empiricism teaches that the bark of the cinchona, the inspissated juice of the poppy capsule, the root of ipecac, the fruit of calabar, the dried juice of the catechu are remedial alteratives. They produce changes in organs or in structures by their influence on nerve current or on vitalized matter. They are natural plant *structures*, which experience has taught, as a crude whole, can influence or conserve life *structures*.

Empiricism Extended in the Direction of Medicine.—Let us pass the evolution which in foods is giving us new forms and combinations of old food-stuffs to serve the palate and the eye, and turn our attention to therapy. Basing his reasoning on observed facts, the thoughtful modern physician, aided by the pharmacist, draws yet finer lines. With his foot on the pedestal empiricism has reared in the use of plants as a whole, he adds thereto another mite. He differentiates between the giving of certain remedial structures for disease names and the giving of them for disease expressions which accompany abnormal conditions that have given rise to such disease names. He learns that even though a fever may be always reduced by aconite, as established by more superficial observation, it is not best to give aconite in all expressions accompanied by fever. He learns that while cinchona is useful in "intermittents," it must be given only in certain stages of the affection. He learns that opium may be a friend or an enemy, dependent on symptoms, idiosyncrasies, and complications; that ipecac has two qualities, and when used in minute doses is useful in a direction that is the very antithesis of emesis, its first field. Such as this he learns by experimentation and observation, and such truths as this can be learned only by observation based on experimentation. He also discovers that given a proven

symptomatic condition, unless there be some exceptional counteracting influence, a known remedy will produce specific effects. The method by which all this is determined is empirical; the ultimate, when established, is considered a phase of scientific art.

The Demands of Science.—But the fact soon becomes apparent that medication for well-known and well-established symptoms is hazardous if one depends on Nature's varying vegetable crudities. As the husk and shell of plants vary their proportions to other parts of the plant, under the influence of seasons, sunshine and showers, likewise do the proportions and relationships of the intercellular structures of certain parts of the plants used in medicine vary. The farmer knows that one season a field of grain may consist of much straw and little oats, while the next year the grain may be heavy and the stalk light. Nor are all plants in a crop uniform. The tree that bears the heaviest load of foliage may be barren of fruit. The most stately cinchona tree may be covered with worthless bark. A small chestnut tree, loaded with fruit, may be overshadowed by a mighty chestnut bearing foliage only. This empiricism teaches. And so empiricism or observation led to the first attempt to make more uniform preparations from the crude parts used in medicine. Came then the crude extracts both fluid and solid, the infusions and decoctions.

Finally, only one hundred years ago, morphine was discovered. Quick followed quinine, and then other bodies of a similar nature. Now entered a new thought. These energetic chemically-constructed ultimates seemed to indicate that behind every natural remedy lay a definite something that could replace in therapy the parent structure. This one-sided conception held the thought and experiment of many talented men for a hundred years, it locks many to-day in its tenacious embrace and which has been carried by some to irrational extremes. That it was a natural line for enthusiasm to take is apparently supported by the aggressive energies of a few educts and products, such as the cathartic resins of jalap and podophyllum (which are in themselves complex structures), the energetic alkaloids, and a few other products which possess in themselves qualities to remind one of the parent structures. Thus it is that the conspicuous example, quinine and morphine, nearly one hundred years ago led to blanket theories (resinoids and alkaloids) which well nigh wrecked the Eclectic school half a century later, and which now distract and

pervert thought in the Regular school, until we observe that medical nihilism, too often the result of such medication, is fostered by continued disappointment in directions where *structures*, not *fragments*, dominate a drug.

The great mass of organic remedial agents has no one dominating definite structure capable of either isolation or of yielding, by chemical destruction, definite ultimates. In them the natural structures, without formula or equation, stand supreme in the face of the aggressive chemist, and both his constructive and destructive art. In the materia medica of intercellular structures, no one chemically-made fragment that can be broken out parallels the drug as a whole, if one knows the whole drug. Indeed, with the vast majority of valuable vegetable remedies, chemistry is inadequate to even *help* identify a drug through the reactions of any known quality possessed by either its chemically-made or chemically-isolated fragments. Scores of plant preparations that for half a century have been valued as remedies, may be mixed; and no chemist in the world can, by his art, identify any one drug of the mixture, or by means of a formula or equation or reaction, point to any therapeutical constituent present in the mixture. Inter-structural compounds exist, by their well-known *qualities* are they established in pharmacy and therapy, but a blank are they to the chemist's art.

The time of thousands of workers has been spent during the past century in the hope that a single thing picked out of a mighty whole can parallel the original structure. A worthy ambition is this, but one that led to the greatest disappointment this writer ever experienced in a loved scientific theory, which thirty years ago held his enthusiastic care, and thirty years ago was sadly relinquished. Unquestionable evidence taught that *fragments* created out of drugs by chemistry do not parallel the natural intermolecular structures that establish drugs as remedies.

Much of the present discouragement of Regular physicians is surely due to the use of fragments only. Unwisely they have ignored the claims of plant structures which in themselves are valuable in medicine, but are neglected and discarded because the test tube and reagent of the chemist cannot create from them bodies like unto the poisonous alkaloids, atropine, strychnine, morphine. These men seek the hurricane; the still, small voice has no part in such medication.

Eclectic thought comprehended the situation in the latter part of the last century, and through clinical experimentation came into possession of a great, rich field which the Regular physician had unwittingly relinquished. It turned toward the evolution of a standard form of clean remedies, as nearly devoid of common plant dirt as possible, which should parallel the natural drugs as a whole, not be a fragment only. The demands of exact Eclectic medication in which small doses of natural, preserved, soluble drug structures were to be used to meet definite symptoms, made necessary the greatest possible exactness and the kindliest manipulation looking to the perfection of these preparations. The fathers foresaw wisely that on this materia medica the life of Eclecticism depended. By the use of this materia medica came their opportunity to do well their work.

The Evolution of Structural Remedies.—The one school in American medicine that has given its thought, its culture, its aim in the treatment of disease by structural vegetable remedies is acknowledged to be the Eclectic school. Whilst free to use all remedial agents, be they animal, vegetable or mineral, its great field has been the development of our native American drugs. It has taken freely from the discoveries of the Regular and the Homœopathic schools, crediting them therefor; it has no less freely given to them. The ambition of the Eclectic has been to investigate, to discover, to demonstrate. With this worthy object, as the various American drugs were investigated, the therapeutical values of these drugs were given to the world. They were placed before the profession under the true names of the plants yielding them. Text-books, materia medicas, works on practice, descriptive both of the drugs and their action in disease, were written. Thus, the facts evolved were ever at the command of men of other schools, whose investigating care was chiefly given in other directions and whose study was chiefly directed towards other fields. The evolution of these Eclectic remedies has been clinical, experimental in human disease expressions (not on animals in health), by a rule which necessitated a long and circumspect study of each remedy. It is a clinical furthering of the empiricism of the past in which as a rule the natural energetic structure of a drug dissolved in an appropriate preservative menstruum, separated from inert matters as much as possible, is viewed as a *whole*, and then used as a *whole*. Due credit is given isolated substances in their useful places. Indeed, the credit of discovering those

most valued in American plant life is to be credited to Eclecticism. But we value above all the interstructural effect that comes from life-bound *structures* endowed with their full vital qualities, preserved in assimilable form. This vegetable Eclectic Materia Medica has been evolved by seventy-five years' study of organized plant structures. To attempt to parallel these remedies by crudities we have left behind generations ago, or by fragments broken out of them, is as illogical as to attempt to use the decomposition products of albumen as a food where experience has proven the value of albumen as a whole. On the use of these valuable structures has the therapy of our school been established, both as to its indications and dosage. It is a therapy and a materia medica that now is increasingly sought, and is greatly needed by the physicians of other schools, whose eyes I believe are at last longingly directed toward the fruit borne by the tree of Eclecticism, in this, its last quarter of nearly a century of patient life.

VANILLIN IN ITS BEHAVIOR TO THE FORMALDEHYDE TESTS.[1]

By Charles H. LaWall.

The accuracy and reliability of any test or analytical method is directly proportionate to the knowledge which has been acquired concerning the means of distinguishing other substances which are liable to be confused with it on account of the similarity of the reaction.

The possibility of error is much smaller in the field of inorganic work, where schemes have been worked out for the separation of all known substances of this class; but in the department of organic chemistry, where the large number and complex constitution of most of the bodies render the application of any definite scheme of separation and identification almost impossible except for a very few substances, the chemist is compelled to rely upon certain reactions known as color reactions in identifying most organic bodies when they are present only in small amounts or mere traces.

The fact that in many instances color reactions of a similar nature are produced by different bodies, often due to remote chemical rela-

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[1] Read at the meeting of the Pennsylvania Pharmaceutical Association, June, 1905, and contributed by the author.

tionship, is usually borne in mind by the careful worker in this field of chemistry, and it is customary to apply all of the known tests for the identification of an organic body before deciding definitely regarding it.

A sample of ice-cream was recently brought to the author of this paper for examination, with the information that it had been reported to contain formaldehyde. An examination by three well-known methods apparently indicated the unmistakable presence of formaldehyde. These methods were the Hehner contact test, the resorcinol-sulphuric acid contact test and the phenol-sulphuric acid contact test. As the author is in the habit of always applying the phenylhydrazine test, this test was applied with negative results, and a further application of the phloroglucol, resorcinol-soda, and hydrochloric acid tests also gave negative results. The flavor of the ice-cream was easily recognized as vanilla, and vanillin being an aldehyde, and thus indirectly related to formaldehyde, it was considered advisable to make some experiments with this substance with a view to ascertaining whether it gave similar reactions to formaldehyde with those tests which had indicated the presence of that substance.

A solution of vanillin, $\frac{1}{1000}$, was made up and employed in the various tests, and it was found to produce color reactions in all of the zone tests which were either identical in appearance with the colors produced by known solutions of formaldehyde which were tested at the same time, or were so close a resemblance as to render comparison necessary in order to distinguish them.

A sample of milk was then flavored with the vanillin and distilled and the reactions applied to the distillate with similar results.

Further investigation of the subject showed that artificial vanillin and the vanillin contained in an extract made from the genuine vanilla bean behaved in exactly the same manner, and that unless the phenylhydrazine, phloroglucol, or one of the other tests mentioned as not producing the reaction, were applied, the presence of formaldehyde in the solution would unhesitatingly be affirmed.

It was considered desirable to know in this connection whether coumarin, which is sometimes associated with vanillin in the cheaper extracts, would produce similar results, but the results with every one of the tests as applied to coumarin were entirely negative.

The following table of experiments upon a number of the sub-

stances examined in this investigation show the comparative results which were obtained:

	Milk.	Milk and Formaldehyde $\frac{1}{20000}$	Formaldehyde. $\frac{1}{20000}$	Coumarin $\frac{1}{1000}$	Vanillin $\frac{1}{1000}$	Milk with Vanillin $\frac{1}{10000}$
Phenol test	no reaction	pink zone	pink zone	no reaction	pink zone	pink zone
Resorcinol test	" "	" "	" "	" "	" "	" "
Hehner's test	" "	violet zone	violet zone	—	violet zone	violet zone
Phloroglucol test	—	—	cherry red color	" "	no reaction	—
Phenylhydrazin test. (*a*) with sodium nitroprusside	yellow	green	blue	" "	" "	yellow
(*b*) with potassium ferricyanide	—	—	red	" "	pale red	—
Hydrochloric acid test	brownish rose color	rose purple	—	—	—	brownish rose color
Resorcinal soda test	yellowish brown color	red color	red color	no reaction	no reaction	yellowish brown color

Solutions containing $\frac{1}{1000}$, $\frac{1}{10000}$, $\frac{1}{100000}$, and $\frac{1}{200000}$, of vanillin were then prepared and all were found to give positive results with the resorcinol-sulphuric acid test, although the $\frac{1}{200000}$ dilution required some time for the rose-colored zone to appear and no definite reaction could be obtained with any higher dilution than this. The phenol-sulphuric acid test was not quite so delicate, being sensitive to $\frac{1}{100000}$, while the Hehner test was found to be sensitive in about this degree also.

THE PENNSYLVANIA PHARMACEUTICAL ASSOCIATION.

By Charles H. LaWall.

The twenty-eighth annual meeting of the Pennsylvania Pharmaceutical Association, which was held at Bedford Springs Hotel, Bedford Springs, Pa., on June 21st, 22d and 23d, was one of the best meetings, both in point of numbers and in the interest displayed in the business sessions, of any that have been held in recent years.

The first or opening session was held on Tuesday afternoon in the assembly room of the hotel. This session was called for the purpose of expediting the work of the convention by transacting many of the routine matters in advance of the opening session, which is always held on Tuesday evening. The secretary's report was pre-

sented, which showed that there had been over 900 notices sent out for the present meeting. The treasurer's report was presented by Mr. J. L. Lemberger, of Lebanon, and showed a total of 430 members in good standing, with 509 members who had not yet been heard from, most of whom only owed for the current year, however. The treasurer's report also showed that the association has a cash balance of over $1,500, which is the highest ever recorded.

The report of the executive committee was presented by the chairman, Mr. Griffiths, of Johnstown, and dealt mainly with the subject of increasing the membership.

The reports of delegates to the various associations were then heard. Mr. LaWall, the delegate from the New Jersey Association, presented the greetings from that association, after which the report of the Committee on Papers and Queries was presented by the chairman, Mr. LaWall, who stated that about thirty papers had been secured, many of which were of great scientific value, and that he desired time enough to present them in their entirety, instead of reading most of them by title, as is sometimes done.

Mr. John Wallace, of Newcastle, presented the report of the Legislative Committee, which showed that this committee had been instrumental in passing the Prerequisite Law and the Fruit Syrup Bill, and had exerted its influence against the Patent Medicine Bill, which had been introduced into the House, which if passed would have worked great hardships upon the druggists, but which they had succeeded in having referred back to the committee, where it remained.

The report of the Pharmacy Board was read by Secretary Miller for Mr. Charles T. George, the Secretary of the Board, after which Mr. Charles Leedom, of Philadelphia, presented the report on Trades Interests, a long report containing several recommendations, and which was referred to the Committee on President's Address for consideration.

The Entertainment Committee then presented an outline of the program which had been arranged for the pleasure of the members.

An Auditing Committee, consisting of Messrs. Blair, Thomas and Grohman, was then appointed, as well as a Nominating Committee, of Messrs. Siegfried, Utech, Lee, Horn and Gorgas.

Mr. D. J. Thomas, of Scranton, then presented the report of the Committee on Adulterations, which was a comprehensive piece of

work in every respect, and which will prove to be a valuable addition to the literature on the subject.

A committee was appointed to discuss ways and means of obtaining funds for next year's entertainment, and consisted of Messrs. Cliffe, Bransome and Lemberger.

The first formal meeting of the association was held in the assembly room of the hotel, on Tuesday evening, at 8 o'clock, and was opened by prayer by the Rev. H. B. Townsend. The local secretary, Mr. Marcy, then introduced Burgess Jordan, of Bedford, who made a pleasant speech of welcome, which was responded to in behalf of the members by W. O. Frailey of Lancaster, and especially in behalf of the ladies by Mrs. W. F. Horn, of Carlisle.

First Vice-President Wray then took the chair while President Koch presented his annual address. In his address President Koch began by referring to the Prerequisite Law, which had been recently passed, and stated that it marked a new era in the history of pharmaceutical education, inasmuch as it now enabled the colleges of pharmacy to do that which they had long desired but were never able to do—raise the preliminary requirements. He said that in an important matter of this kind the Board and the colleges should be in perfect harmony to achieve the best results, and that the elevation of the standard would necessarily have to be gradual and not revolutionary. He also referred to Section 6 of the present Pharmacy Law, which allows the sale of medicines by grocery and department stores, and recommended its repeal. The registration of apprentices and the ownership of the prescription, which latter question has recently been decided in North Carolina by legislative enactment, were also referred to the Legislative Committee for their consideration, with a view of obtaining the necessary legal enactment. He commended the Legislative Committee particularly upon the work which had been done during the past year, not only along the line of obtaining beneficial legislation, but also in preventing obnoxious legislation. He re-endorsed the Mann Bill and recommended that its passage be secured at as early a date as possible. The N.A.R.D. was referred to in commendatory terms, and the American Pharmatical Association was also endorsed unhesitatingly, and attention was called to the September meeting of that body in Atlantic City, and the fact that less than 4 per cent. of the druggists of the United States were members of the body. The membership of the State

Association formed the closing portion of the president's address, which, upon motion of Mr. Lemberger, was accepted and referred to a committee consisting of Messrs. Lackey, Thomas, Heck, Wallace and Frailey.

Professor Remington then addressed the meeting upon the subject of the new Pharmacopœia, a copy of which he exhibited as being an advance copy of the first edition which would be out in several weeks. He described many of the difficulties which the Revision Committee have labored under, which have contributed to delay the completion of the work, and described some of the points of difference between the old and the new editions and referred to the various styles of binding in which it would be issued.

On Wednesday morning the Association convened at 10 o'clock and the reading of the minutes of the previous meeting was followed by the sending of congratulatory messages to the other State Associations which were in session at the same time. The Committee on Time and Place of Next Meeting then reported in favor of Glen Summit, near Wilkesbarre, June 26, 27, 28, 1906, which report was received and unanimously adopted. The reports of delegates to other associations were then heard, after which the chairman of the Committee on Papers and Queries took charge and the reading of papers was begun.

The first paper read was "The Awakening of the Pharmacist," by B. E. Pritchard, and was followed by three papers in answer to Query No. 17, "Is the N.A.R.D. a Scheme to Get Something for Nothing?" by W. O. Frailey, J. Leyden White and T. H. Potts. These papers elicited a discussion which lasted during the remainder of this session, in which many of the statements were warmly debated. The discussion was participated in by Messrs. Redsecker, Emanuel, Lowe, Apple, Rehfuss, Millener, W. F. Horn, Pritchard, McIntyre, Walton and Wray.

The second session on Wednesday was opened at 3 P.M. and after hearing a long report from Mr. M. N. Kline, the delegate to the N.W.D.A. and the Proprietors' Association, the reading of papers was again resumed. The first paper read at this session was entitled "Rules for Prescription Filling," by E. F. Cook, and was read by Dr. C. B. Lowe, in the absence of the author. This paper was discussed by Mr. H. C. Blair, who described the method of filling and checking prescriptions which has been in use in his store for so many years.

Mr. Theodore Campbell, of Overbrook, then read two papers, one on "A Method of Advertising," and the other "A Check on Receipted Bills." R. H. Lackey then described a new prescription difficulty which had recently come under his observation, after which Prof. Joseph P. Remington read a paper on the "Prerequisite Law."

Dr. C. B. Lowe read a paper on "Drug-store Experience," which was followed by a paper on "The Use of the Mimeograph in Pharmacy," by E. F. Cook, which was read and explained by Prof. F. P. Stroup.

A paper by H. F. Ruhl, in answer to a number of queries, led to an interesting discussion and was followed by a paper entitled "The Two Windows Which Sold the Goods," by M. W. Bamford, of Reading.

Mr. Emanuel then read a long paper in answer to Query No. 18, concerning the lack of "Professionalizing Tendency of the American Pharmaceutical Association."

The final business session of the week was held at 10 A.M. Thursday. The committee appointed to report upon a plan for financing the entertainments reported a plan which was referred back to them for further consideration.

The Nominating Committee reported the following nominations: President, D. J. Thomas, of Scranton; First Vice-President, S. A. Stright, of Braddock; Second Vice-President, Albert Cliffe, of Ridgway; Treasurer, J. L. Lemberger, of Lebanon; Secretary, J. A. Miller, of Harrisburg; Local Secretary, G. P. Raser, Wilkesbarre. Executive Committee, W. E. Lee, Philadelphia, Chairman; L. L. Walton, Williamsport, and Croll Keller, Harrisburg. Upon motion of Mr. Redsecker, of Lebanon, Mr. Charles H. LaWall, the chairman of the Committee on Papers and Queries, was directed to cast the affirmative ballot for all of the nominees, which was accordingly done.

The Committee on President's Address then presented a report containing a number of recommendations which were discussed seriatim and adopted, after which the report was adopted as a whole.

Mr. P. H. Utech then read a paper on "The Nostrum Evil," which was followed by a paper by F. S. Nagle on "The Declining Art of Prescribing." Mr. W. L. Cliffe then presented a set of resolutions advocating the erection of a bronze monument in the grounds

of the Smithsonian Institution in Washington, D. C., to William Procter, Jr., the Father of American Pharmacy. The American Pharmaceutical Association, which has already inaugurated the work, was named as the custodian of the fund, and a committee of five was directed to be appointed by the president to confer with the A. Ph. A. Committee and raise subscriptions. President Koch appointed the following members of the committee: Prof. Henry Kraemer, C. W. Hancock, William McIntyre, David Horn, and Prof. J. P. Remington.

Several papers were then read, after which the meeting adjourned until 8 o'clock Thursday evening, when the officers were installed with the usual ceremonies.

A number of interesting papers were read at the last session, a few of which were read by title.

The entertainment features of the Association were quite up to the usual high character and contributed largely to the enjoyment ot the meetings by those who were in attendance.

PHILADELPHIA COLLEGE OF PHARMACY.

The quarterly meeting of the members of the College was held June 26th, at 4 P.M., in the Library, the President, Howard B. French, presiding. Twelve members were present.

The minutes of the annual meeting, held March 27th, were read and approved.

The minutes of the Board of Trustees for March 7th and April 4th were read by the Registrar and approved.

Report of Committee on Membership.—From this report it is learned that the active membership reside mainly in Philadelphia and the nearby towns. Other sections of Pennsylvania are represented by fifteen members, and sixteen other States are represented by thirty members.

Of the associate members four reside in Pennsylvania and thirteen in other States; the honorary members numbering forty-two, and the corresponding members numbering thirty-one.

A number of names were reported as having "forfeited membership" by non-payment of annual dues for three years.

Report of Committee on Necrology.—Active members deceased during the year numbered four: William J. Jenks, William Weight-

man, Julian Fajans, M.D., and Henry N. Rittenhouse. Honorary members deceased: Alfred H. Allen, Frederick Hoffmann, A. B. Prescott, Alfonso Herrera, Helen A. Michael, Albert Hilger. Corresponding member deceased: C. R. C. Tichborne.

The delegates to the Pennsylvania Pharmaceutical Association, by its Chairman, Prof. C. B. Lowe, presented a brief report, in which they told of the very successful meeting recently held at Bedford Springs. Twenty-eight papers were presented. D. J. Thomas, of Scranton, was elected President. The next meeting is to be held at Glen Summit, June 26–28, 1906.

Announcement was made of the death of Mrs. Procter, widow of the late William Procter, Jr. Also of the death of Henry N. Rittenhouse, a member of the College since 1854. He served many years on the Committee on Publication, and also for some years on the Board of Trustees.

The resignation of Edwin W. Murphy, of Macon, Miss., was accepted.

APPOINTMENTS.

Committee on Nominations.—Joseph W. England, Joseph P. Remington, Henry Kraemer, Jacob M. Baer and O. W. Osterlund.

Committee on Necrology.—Henry Kraemer, Samuel P. Sadtler and Gustavus Pile.

Historical Committee.—George M. Beringer, Henry Kraemer, Thomas S. Wiegand.

Delegates to American Pharmaceutical Association. — Henry Kraemer, Joseph P. Remington, Samuel P. Sadtler, C. B. Lowe and M. I. Wilbert; as alternates, M. N. Kline, E. M. Boring, Miers Busch, W. L. Cliffe and J. W. England.

ABSTRACTS FROM MINUTES OF THE BOARD OF TRUSTEES.

March 7.—Committee on Library reported a number of accessions to the Library by donation, purchase and exchange. John F. Hancock, of Baltimore, Md., elected to associate membership.

April 4.—M. N. Kline elected Chairman of the Board of Trustees; George M. Beringer, Vice-Chairman; Jacob S. Beetem, Registrar. Committee on Instruction recommended lengthening the first and second year courses and entrance requirements, detailed at length in the eighty-fifth annual announcement just issued.

C. A. WEIDEMANN, *Secretary.*

HENRY TROTH,
1794–1842.

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PLANT MORPHOLOGY AND TAXONOMY.[1]

By HENRY KRAEMER.[2]

The history of botany, so far as the authentic and correct record of facts and observations is concerned, like the history of the other descriptive natural sciences, may be said to date from the fifteenth and sixteenth centuries. While it is true that the works of the older writers, like Theophrastus, Dioscorides, Pliny and Galen, contain matter of historical interest, still from the modern scientific point of view they can scarcely be regarded as more than curiosities.

With the discovery by Copernicus that the earth is not the center of the universe, and with the revival of learning in the fifteenth and sixteenth centuries, there was an awakening in scientific investigation and the dawn of a new era in thought. This was the period of which Pater writes. He says:—

"But it is in Italy, in the fifteenth century, that the interest of the Renaissance lies, in that solemn fifteenth century which can hardly be studied too much, not merely for its positive results in the things of the intellect and the imagination, its concrete works of art, its special and prominent personalities, with their profound aesthetic charm, but for its general spirit and character, for its ethical qualities of which it is a consummate type."

If we trace the history of the study of botany and of its different divisions, we find that taxonomy or classification preceded morphology as a distinct branch, but morphology being the basis of taxonomy, that is, one of the factors upon which the taxonomist

[1] Presented at the Lewis and Clark Pharmaceutical Congress, Portland, Oregon, July 12, 1905.

[2] The author's thanks are due Miss Florence Yaple, Philadelphia, for valuable assistance in the preparation of this paper.

depends, morphology should rightly precede taxonomy, and I have therefore chosen first to consider the subject of morphology and afterwards to endeavor to show its relation to taxonomy.

MORPHOLOGY.

Before considering the modern meaning of the word morphology, it may be well, on an occasion like this, briefly to refer to some of the important steps in the evolution of this part of the study of botany.

While Cesalpino (1583), an Italian botanist, was termed by Linnaeus, the first systematist, he having furnished the first formal classification of plants, he was also among the earliest research workers in botany and may be regarded as the founder of plant morphology. He furnished very many excellent observations on the different parts of plants, such as the nature of tendrils, the position of leaves on the stem, the development of fruits, and the arrangement of seeds.

In contrast to the older botanists or herbalists of Germany, Cesalpino tried to discern the significance of the different parts of the plant, but was handicapped by the Aristotelian mode of treating natural phenomena still in vogue. His contemporary, or successor, the German scientist Jung was, however, an opponent of scholasticism, and in his studies in comparative morphology may be said to have introduced the positive method of investigation.

The demonstration of the sexuality of plants by Camerarius, in 1691–1694, must always rank as one of the most important contributions to the science of botany. Nearly a century later Camerarius's observations were extended and confirmed by Koelreuter (1761–1766), whose experiments in hybridization have become classical, and by Sprengel (1793), the results of whose work in cross-pollination and the study of the relation of insects to flowers, were used to such excellent advantage by Darwin in 1859. In addition, Gärtner not only contributed to our knowledge of fertilization, but devoted much time to the consideration of the morphology of fruits and seeds, and in his great work, published in 1788, gave descriptions and illustrations of the fruits and seeds of more than a thousand species. Another of the results of his work was the discovery that the spores of the Cryptogams differ from the seeds of the higher plants in that they do not contain a well defined or developed embryo.

While the seventeenth century is marked by the important discovery made by Camerarius, the eighteenth century is especially noted for the establishment of the doctrine of epigenesis. In 1759 Kasper Friedrich Wolff showed in a dissertation on the Theory of Generation, that instead of the young organism being preformed in the egg, as had been previously maintained, it is gradually developed from the substances contained therein. Wolff's extensive studies on the development of both animals and plants entitle him to the distinction, given him by Goebel, of being the founder of the history of development, or, in other words, he may be regarded as the founder of our modern ontogenetic method of study. To Wolff also belongs the credit of discovering the vegetative point (*punctum vegetationis*) in plants, which is one of the distinguishing marks between the higher plants and animals.

In the early part of the nineteenth century De Candolle proposed a natural system of classification of plants, and by many this is considered to be his most enduring work. While this may be true it should not be forgotten that his system was based upon extensive morphologic work, and his doctrine of the symmetry of plants embodied a series of morphological observations which still hold true. De Candolle was able to a large extent to free himself of the erroneous teachings of the past, and was among the first, as pointed out by Darwin, to show that species are not immutable creations. In spite of certain inconsistencies in De Candolle's work, Sachs says that to him "belongs the merit of being the first to point emphatically to the distinction between morphological and physiological marks, and to bring clearly to light the discordance between morphological affinity and physiological habit."

Notwithstanding the far-reaching importance of the researches of Wolff, up until this time no one appears to have appreciated the necessity of a study of the successive stages of development of the organs of plants in botanical work, it being the custom of the time to devote attention to mature organs only. To Robert Brown (1825) belongs the credit of developing and establishing the ontogenetic method in the study of plants, that is, the study of the development of the individual beginning with the germination of the seed or spore, and which now constitutes one of the most important lines of investigation. During the course of his investigations on the organs of fructification in the Cycads and Conifers he

was able to show the close relation of these groups, and to demonstrate the value of such studies in establishing a scientific taxonomy.

Contemporaneous with De Candolle and Brown was Goethe (1790), the German poet and naturalist, who promulgated the doctrine of metamorphosis, whereby he "derived all the different species of plants from one primitive type, and all their different organs from one primitive organ—the leaf." Following the lead of Wolff there was a tendency to reduce the plant to only two parts, namely, stem and leaves, the parts of the flower being considered modified leaves and the root a modification of the stem. While it is generally conceded that in the evolution of plants the development of leaves preceded that of flowers; still we now look upon the flowers as arising independently and not as being derived from the leaves. That this is true seems also to be borne out by the fact that in many plants, particularly trees, the flowers appear before the leaves. While it is unfortunate that the doctrine of metamorphosis was taken up by the "nature philosophers" and made more or less ridiculous by their speculations, and while the evolutionary ideas of Goethe, as pointed out by Haeckel, like the analogous ideas of Kant, Owen, Treviranus and other philosophers at the commencement of the nineteenth century, did not amount to more than certain general conclusions, the great merit of Goethe's work lies in the fact that he was among the first to appreciate the value of the study of the living plant. He not only introduced the word "morphology," but has also given us a definition of the term. He says:—

"Scientific men in all time have striven to recognize living bodies as such, to understand the relations of their *external, visible, tangible* parts, and to interpret them as indications of what is within, and thereby in some measure to gain a comprehensive notion of the whole. . . . We find therefore in the march of art, of knowledge, and of science, many attempts to found and construct a doctrine which we may call morphology."

While Goethe gave us a new point of view in the study of the biological sciences, Wolff, De Candolle, Brown and others laid the foundations for the morphological study of plants, which was brought to such perfection under the guidance of Nägeli, Hofmeister and others about the middle of the last century.

In the work of Jung, which has already been referred to, we see how the mathematical bent of his mind enabled him to give not only

clear definitions, but to recognize a certain symmetry in the forms of stems and leaves. It was not, however, until the time of Schimper (1834) and Braun (1835) that mathematical conceptions with regard to plant members were formulated and made the basis of morphological study. Schimper introduced a system of phyllotaxy, known as the spiral theory, the principal feature of which was the assumption of the spiral arrangement of leaves. While the theory is a beautiful one on paper, it has been found in practice to have a limited application, and can not be said to account for the factors which influence the arrangement of leaves, as pointed out by Hofmeister. Its chief value lies in the fact that it directed attention to the study of the relative position of organs and caused botanists to inquire into the factors influencing their form, position, and arrangement on the plant. It possibly also led to the application of mathematical and mechanical principles in the study not only of the disposition of organs but also in the distribution of tissues as illustrated in later years in the work of Schwendener and his students. At any rate it is interesting to make mention here of Schwendener's great work on the mechanics of growth, which must be looked upon as a most important contribution to the study of the fundamental principles of morphology.

We now come to a period which was marked by a series of brilliant investigations, and which has been one of the most fruitful in the history of botanical science. In 1838 Schleiden announced the fact that the cell is the fundamental unit in plants and showed that all the different tissues of the plants are combinations of cells. Several years previous (1831) Robert Brown had discovered the nucleus in the epidermis of the orchids, and it remained for Von Mohl (1846) to give the first accurate description of protoplasm and to establish its fundamental nature.

In contrast to the cellular theory established by Schleiden and his followers, which appeared to be all-sufficient for so long, we now (1892–1895) have the conception that the energids are the fundamental units in the plant structure; an energid, according to Sachs, being composed of a single nucleus and the protoplasm which it dominates. Thus a cell may be monergic or polyergic, depending upon the number of nuclei which it contains.

It was also during the middle period of the last century that Nägeli carried on his splendid researches on the development of

cells and showed by his studies on the starch grain and cell-wall how intricate and far-reaching the problems of morphology are. Von Mohl's studies on the nature and distribution of tissues in plants, together with the work of Hanstein and others, laid the foundation upon which De Bary in 1877, together with his own researches, wrote his book "The Comparative Anatomy of the Vegetative Organs of the Phanerogams and Ferns," which is still a recognized authority.

It was during these same years that the series of investigations on the mode of reproduction in plants was begun, which culminated in the brilliant results obtained by Hofmeister, and which has been carried on with increasing interest even to the present time. The work begun by Brown on the mode of fertilization in the Phanerogams was carried to completion by Amici in 1846. The work of Bischoff, Mirbel, Unger and Nägeli on the male sexual organs in the Archegoniatae was supplemented by that of Hofmeister, who discovered the archegonia or female organ of reproduction and who thus gave the first authentic description of the mode of fertilization in the lower plants. His work also brought to light one of the most interesting discoveries in the whole realm of botanical science —namely, the alternation of generation in plants. Hofmeister extended his studies to the Conifers and Angiosperms, and thereby not only established the affinity between these two groups, but showed their genetic relation to the Pteridophytes, and thus contributed a series of the most important researches to what has now come to be known as phylogenetic morphology, or the study of the origin and relation of the various plant groups.

During the period between 1850 and 1860 the discovery of the alternation of generation in plants was further confirmed by Hofmeister's work on the Equisetaceae, Isoetes, etc., and by the investigations of Pringsheim, Cramer, Mettenius and others on other Pteridophytes.

Considerable light was thrown on the nature of fertilization in the Algae by the fortunate discovery by Thuret (1854) of the process as it takes place in Fucus. This was followed by Pringsheim's studies on Vaucheria, in 1855. It remained for De Bary to study the fungi, and he proved himself to be one of the greatest masters in botanical science. He originated methods by which the developmental history of these organisms could be studied, and at the same time showed their relation to their hosts.

In considering the history of the morphological study of plants, mention should be made of the important work which was carried on by Sachs (1858–1875). By the introduction of his method of plant cultures and apparatus for controlling the conditions under which plants grow he not only contributed to our knowledge of plant physiology, but also made many observations having a bearing on experimental morphology. The methods used by Sachs have been extended and perfected in recent years, and in the hands of Goebel and other investigators have yielded results which have materially assisted in raising plant physiology and plant morphology to the high plane which they now occupy, and which furthermore show the interdependence of these two divisions of botanical science. In the same manner have the methods of research instituted by De Bary yielded such fruitful results in the hands of Klebs and others in their studies on the lower orders of plants.

Following Hofmeister, who may be regarded as the founder of experimental morphology, Sachs did very much to give direction to the newer morphology which has been developed, particularly in the past fifteen or twenty years.

Sachs was, however, a representative of what may be considered a transition period between the older formal morphology which considered the external configuration of plants independent of their function and physiological activities, and the newer morphology which considers that the form and function of an organ stand in the most intimate relation to each other. In the chapter on "Morphology of the External Conformation of Plants," as given in his text-book of botany, Sachs says:—

The parts of plants which are ordinarily termed their organs, very various in their form and serving different physiological purposes, may be considered scientifically from two different points of view. The question may be asked at the outset: How far are these parts adapted, by their form and structure, to perform their physiological work? In this case they are regarded from one side only as instruments or organs, and this mode of regarding them is itself a part of physiology. Or else these relationships may, for the time, be completely put aside, and the question may be kept out of consideration what functions the parts of the plant have to fulfil, and the only point kept in view may be where and how they arise, in what manner the origin and growth of one member are related in space and time to those of another. This mode of regarding them is the morphological one. It is obvious that this mode is as one-sided as the physiological; but investigation and description require,

here as everywhere else in science, abstractions of this kind ; and they are not only not hurtful, but even of the greatest assistance to investigation, if the investigator is only clearly conscious that they are abstractions.

It is thus seen that Sachs even during the most active period of his life not only admitted the propriety of separating the consideration of function from the study of morphology, but claimed that there was an advantage in so doing. As a basis for morphological investigation Sachs suggested the following lines of study: A study of the development of parts, that is the development of members or organs; their mutual positions; the relative time of their formation; and their earliest stages. From the modern point of view he has left out the most important factor in the study of morphology, namely, the study of the relation of the form and function of organs. In other words his proposition might be likened to an equation in chemistry in which one of the factors is left out. It is fortunate, however, that Sachs later changed his views with regard to this subject, for, as pointed out by Goebel, the teaching of such abstractions has led to one-sidedness and incorrect generalizations.

TRUE MORPHOLOGY OR ORGANOGRAPHY.

According to the morphology of to-day the structure of an organ has a direct relation to its function, or, in other words, structure is modified by function, and the two can not be separated if we desire to treat the subject comprehensively.

Herbert Spencer was among the first to insist upon the necessity of the study of function in connection with that of structure. He says:—

The division of morphology from physiology is one which may be tolerably well preserved, so long as we do not carry our inquiries beyond the empirical generalizations in their respective phenomena ; but it is one which becomes in great measure nominal, when the phenomena are to be rationally interpreted. It would be possible, after analyzing our solar system, to set down certain general truths respecting the sizes and distances of its primary and secondary members, omitting all mention of their motions ; and it would be possible to set down certain other general truths respecting their motions, without specifying their dimensions or positions, further than as greater or less, nearer or more remote. But on seeking to account for these general truths, arrived at by induction, we find ourselves obliged to consider simultaneously the relative sizes and places of the masses, and the relative amounts and directions of their motions. Similarly with organisms. Though we may frame sundry comprehensive

propositions respecting the arrangement of their organs, considered as so many inert parts; and though we may establish several wide conclusions respecting the separate and combined actions of their organs; without knowing anything definite respecting the forms and positions of their present organs; yet we can not reach such a rationale of the facts as the hypothesis of evolution aims at, without contemplating structures and functions in their mutual relations. Everywhere structures in great measure determine functions; and everywhere functions are incessantly modifying structures. In nature the two are inseparable co-operators; and science can give no true interpretations of nature without keeping their co-operation constantly in view. An account of organic evolution in its more special aspect, must be essentially an account of the interactions of structures and functions, as perpetually altered by changes of conditions.

At the present time Goebel probably stands as the chief exponent of the newer morphology. In his book on the organography of plants he has presented some of the arguments in favor of this newer conception in regard to plant structures, and in a most characteristic and clever manner has substituted the word "organography" for that of "morphology," and thus frees himself of the older conceptions in regard to the subject, and at the same time adopts a more expressive term. According to Goebel the morphologist should look upon the form of plants as an expression of living processes. He should endeavor to determine in what degree the form of an organ shows an adaptation to external conditions and to what extent it is dependent upon these and internal conditions. To make a practical application of his meaning, Goebel says that he considers it infinitely more important to determine the factors which cause the inequilateral development of a leaf, as of begonia, than to construct a phylogenetic hypothesis unsupported by facts, and in summing up his arguments on the subject of morphology, or organography, he says:—

The idea that morphology has nothing to do with the function of organs has been acquired entirely because the fact has been overlooked that the transformations seen in organs are conditioned by a *change of function*. Their functions therefore have been treated as subordinate in determining the characters of organs, and the external relations alone have been taken as the chief points for consideration. But the relationships of mere form are by no means the permanent ones 'in the tide of phenomena.' They also change. The determination of this change, that is to say, of the alterations which have taken place, and are believed to take place, in the formation of organs of a natural group, is one of the weightiest tasks of organography. If we separate function from form we are at once led into altogether unfruitful speculations.

We thus see that morphology has become a science, which is not merely concerned with the form and structure of organs, but is more especially concerned in the study of the factors which influence form and structure, and it is therefore not only one of the most interesting departments of biological science, but may be regarded as its very soul, as pointed out by Darwin. According to Goebel there are two branches of experimental organography to be considered:

(1) The reciprocal influence of organs upon one another, which is termed *correlation*.

(2) The influence of external factors, which are designated by Herbst as *formative stimuli*.

The reciprocal influence of one organ upon another may be either *quantitative* or *qualitative*, although there is no sharp distinction between the two. In quantitative correlation certain primordia are suppressed while others apparently develop and enlarge at their expense, as for example, it is a common occurrence for most of the ovules to be entirely suppressed while the available nutritive material is used in the development of the few remaining ones, as in the horsechestnut. In qualitative correlation an organ may assume a different direction, and even the function of another part, if this be injured, removed or arrested in its development. As an example of this Goebel mentions that the transformation of the leaflets of pea may be hindered by removing other leaflets. This plasticity is not confined to any one organ, but is more or less characteristic of all parts of the plant by reason of certain latent properties of the protoplasm. The external factors influencing the development of organs may be enumerated as follows: Light, moisture, temperature and gravity, and those of a purely mechanical nature as well.

As a result of the studies in experimental morphology, or experimental organography, as it is termed by Goebel, certain underlying principles have been deduced, to which attention should be directed. These were brought out in an excellent paper on "The Cardinal Principles of Morphology," read before the Society for Plant Morphology and Physiology, in 1900, by Professor Ganong, who was a student of Goebel's.

The principles formulated by Professor Ganong are as follows:—

(1) The Continuity of Origin.—No functional structure ever arises *de novo*, but only from the modification of a pre-existing structure.

(2) Opportunism.—The direction taken in metamorphosis is not determined

by obedience to any preformed plan, but, except for the influence of the inertia of the heredity of the particular part, follows the factors potent at the moment.

(3) Functional Domination.—In metamorphosis it is function which takes the lead and structure follows.

(4) Indeterminate Anatomical Plasticity.—In all anatomical characters (size, shape, number, position, color, and cellular texture) plant-organs are not limited by anything in their morphological nature, but under proper influence may be led to wax and wane indefinitely in any of these respects.

(5) Metamorphosis Along lines of Least Resistance.—When through a change in some condition of the environment, the necessity arises for the performance of a new function, it will be assumed by the part which happens at the moment to be most available for that purpose, regardless of its morphological nature.

(6) Metamorphosis by Transformation.—Since all parts of the plant actually are organs, new organs can arise only by the transformation of previously existing ones.

(7) Gradation in Morphological Membership.—In the progressive development of metamorphoses, difference of degree passes over gradually into difference of kind.

TAXONOMY.

It will not be possible in the scope of this paper to trace the history of taxonomy with the same detail that was done under morphology. Nor does this appear to be necessary, for, as pointed out at the beginning of this paper, taxonomy is dependent upon morphology, and therefore the history of the latter is to a greater or less extent the history of the former, although this is not strictly true.

The older systems of classification were called artificial because they took into consideration only the superficial and gross characters of plants, while the aim of the so-called natural systems has been to group plants according to their essential or fundamental characters. But as a matter of fact our natural systems are more or less artificial or conventional because of our imperfect knowledge of plants.

Practically speaking, our interest in taxonomic work dates from the time of Linnaeus, who was an all-round naturalist, and in his *Systema Naturae* (1731) gave a classification of plants and animals so far as they were known to him. While Linnaeus's system was an artificial one, the main divisions being based upon the characters of the stamens and pistils, still he recognized the necessity for a natural system and even proposed one, although he did not follow it in practice. To him we are also greatly indebted for the development of

the binomial system of nomenclature. In Tournefort's system (1693) of classification the genera were considered to be the units, and while Linnaeus at first agreed with this, he later came to regard the species as distinct creations and therefore the units in systematic work.

While it has been pointed out that Linnaeus's belief in the immutability of species was the one great defect of his teaching, still, considering the fragmentary knowledge of plants and the more or less chaotic condition of taxonomy at that time, it is doubtful if his work would have been any more accurate than it was had he not been dominated by the dogma of the creation of distinct species. But of course it should not be forgotten that the harm which lies in erroneous doctrines or teachings is the influence which they have on subsequent thought and work, and Linnaeus being such a high authority it is no doubt due largely to his influence that the belief in the fixity of species prevailed with more or less force until the appearance of Darwin's Origin of Species, in 1859.

We are confirmed in this latter conclusion by the fact that when Jean Lamarck, in 1809, clearly showed that species are not immutable, his views were opposed by nearly all of the highest authorities and were practically buried for fifty years. Lamarck showed that the organism was modified by its environment and that the existing complex forms were derived from simpler ones, and it only remained for Darwin to supply the remaining element in the theory of descent, namely, the principle of natural selection.

Darwin's views were backed by such a mass of empirical data and the time being ripe for the promulgation of his doctrine of evolution, they were not long in gaining a following, and, as is now well known, marked the beginning of a new epoch in biological science.

As pointed out by De Vries, Darwin recognized two possibilities with regard to the origin of species, the one being the sudden and spontaneous production of new forms from the old stock, and the other being "the gradual accumulation of those always present and ever fluctuating variations which are indicated by the common assertion that no two individuals of a given race are exactly alike." The view founded upon the supposition that individual fluctuations constitute the chief factor in organic evolution gained the ascendancy in the start, this view being accentuated by Darwin himself and supported by Wallace as the exclusive factor because there was more evidence in favor of it.

De Vries, on the other hand, as a result of his own experiments and those of others, claims that new species arise by discontinuous variations, as termed by Bateson, or by mutations—that is, the sudden appearance of new characters—as termed by De Vries, who even goes so far as to state that species and varieties are not known to originate in any other way at the present time. De Vries considers that there are periods of mutation when new species suddenly make their appearance, or the type may remain constant for many, or perhaps even hundreds of years without the appearance of a new species, although it is claimed that the periods of mutability and stability alternate more or less regularly.

In considering the subject of species and varieties it is essential to make a clear distinction between specific and varietal marks, and mere individual variations or fluctuations, such as differences in size, color, etc.

The true significance of this tendency to variation on the part of individual plants, while better understood by the horticulturist and experimental morphologist, is not always appreciated as it should be by the systematist, and he has attached more importance to these fluctuations than he should have done. It thus comes about that frequently transient and trifling characters are made the basis of taxonomic work.

While I have no intention of attempting to indicate the lines along which taxonomic work should proceed, I may be permitted at this time to indicate one or two of the tendencies which are coming to the front in the determination of species. De Vries, in his recent book clearly shows what is meant by species and has suggested a way by which we may determine species with certainty.

As is pretty well understood, there are two main lines of organic evolution at large, namely, progression and retrogression. With these principles in mind we are able to appreciate what constitutes a new species or variety. When a species arises which exhibits entirely new characters or characters different from its ancestors, and remains constant for some years, it is considered to be a new species. When a species shows a loss of some usually superficial character, this constitutes a variety, or, more properly, a retrograde variety. A species which has acquired some characteristic of an allied form likewise constitutes a variety.

While species are considered to be the true units in organic life, there is still much uncertainty as to what constitutes a species, as already indicated, and, furthermore, it has been shown on experimental grounds that many systematic species, "as they are accepted nowadays, are as a rule compound groups. Sometimes they consist of two or three, or a few elementary types, but in other cases they comprise twenty, or fifty, or even hundreds of constant and well differentiated forms." It is interesting to note in this connection that while Linnaeus held to the view that species were distinct creations, he nevertheless recognized the compound nature of the then existing species.

According to De Vries the real units are the elementary species; their limits often apparently overlap and can only in rare cases be determined on the sole ground of field observations. He then goes on to say that pedigree-culture is the method required and that any form which remains constant and distinct from its allies in the garden is to be considered as an elementary species.

To obviate the difficulties which would arise from the multiplication of species, their numbers being already cumbersome, De Vries suggests the recognition of two sorts of species. He says: "The systematic species are the practical units of the systematists and florists, and all friends of wild nature should do their utmost to preserve them as Linnæus proposed them." On the other hand, he maintains that "both for the theory of descent and for our conception of systematic affinities at large," a study of elementary species is essential. "For it is obvious that they only can be observed to originate, and that the systematic species, because they are only artificial groups of lower unities, can never become the subject of successful experimental inquiry."

For some time past, in the study of certain of the cryptogams, as bacteria, yeasts and fungi, there has been a disposition to rely upon physiological rather than morphological characters, this being due not only to the fact that these are more constant and characteristic in these organisms, but also to the fact that distinct morphological characters are entirely wanting in some cases. While the necessity for this additional study in the higher plants is not so apparent on account of the presence of well-defined morphological characters, still the value of physiological marks as one of the bases of classification

is coming to be recognized. The best illustration of this is to be found in the monograph on the genus Eucalyptus by Baker and Smith. They say:—

When this research was first started it was intended to follow the usual morphological systematic classification of previous botanists; but as the work progressed it was found that nothing definite could be arrived at if such a course were followed.

By working on morphological grounds alone it was found that many of the so-called individual species possessed different barks, timber, oils, dyes, etc., a state of things which quite differed from our definition of a species, and consequently, such an artificial system (as this research appeared to prove it) had to be discarded, and what is apparently a more real or natural system of classification had to be adopted, viz., founding a species, not on morphological characters of dried material alone, but on:

(1) A perfect field knowledge of the trees.

(2) The nature and character of their barks.

(3) The nature and character of their timbers.

(4) Morphology of their fruits, leaves, buds, etc.

(5) Chemical properties and physical characters of the oils, dyes, kinos, etc., and any other evidence, such as histology, physiology, etc., that will assist in establishing differences or affinities of species.

Our experience shows that a species so founded is practically constant in specific characters, however great the range of distribution may be.

It is thus seen that in both morphological and taxonomic work, experimental and physiological studies are coming to be recognized more and more as of fundamental importance, and that the old comparative method alone is no longer adequate in dealing with the problems which confront either the morphologist or taxonomist. It is apparent that a large amount of research work along various lines is necessary to establish species with certainty, unless indeed recourse be had to physiological studies and pedigree cultures alone, which are not less laborious.

While lack of thoroughness in both morphological and physiological investigations is no doubt partly responsible for the confusion existing in systematic work, still there has been another factor which has been more or less demoralizing, and this is the manner in which the nomenclature question has been handled in recent years. To say the least, our system of nomenclature is truly mediæval. When we think of the efforts of Linnaeus to simplify botanical nomenclature, we cannot but wonder what he would think, were he living, of the botanical names of to-day, burdened as they

are with authors' names; or of the fact that the mere discovery of an error in the spelling of a botanical name may entitle the dis coverer of the error to attach his name to the plant name in addition to that of the original author. Professor Bailey has well defined our position with regard to taxonomy and nomenclature. He says:

> Our ideas of what constitutes species and varieties are free and extensible nough, but our methods of designating those ideas still follow the formalism of a century ago—are in fact more inflexible than they were in the time of Linnaeus. If nomenclature is inelastic, schemes of classification within the genus or species must likewise be inelastic, for the classification is but an expression of our ideas of the relationships of the objects that we name. Our nomenclature does not express either the knowledge or point of view of our time.

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INTERNATIONAL BOTANICAL CONGRESS.[1]

The second International Botanical Congress was held at Vienna, June 11–18, 1905, and was highly successful in every way. There was a large and unusually representative attendance, the list of members containing about 600 names. Deducting ladies registered with husbands or relatives, and the considerable number of amateurs from Vienna and the neighborhood, it is certainly safe to say that there were present nearly 400 professional botanists. Of that number nearly one-half would be known by name to any one familiar with botanical literature, and among these were many whose reputation is world-wide. Naturally Austria was most numerously represented, but Germany sent a large contingent, and nearly all the European countries were represented, except perhaps those of the Iberian and the lower Balkan peninsulas. The English were few—a half-dozen at most. Sixteen American botanists were present: Arthur, Atkinson, Barnes, Barnhart, Blakeslee, Britton (Mr. and Mrs.), Brown, Campbell, Coville, Duggar, Robinson, Shear, Trelease, Underwood, and Woods. But American societies were sadly negligent, and many were unrepresented which might have delegated authority to some of the sixteen.

The Congress was opened in the Festsaal of the University by Wiesner, with addresses of welcome by the minister of agriculture, speaking for the Emperor; by the burgomeister, for the city; and by the rector, for the university. Bonnet, secretary of the Paris Congress, gave a historical statement of the organization of the present congress, and Reinke (Kiel) delivered an address on "Hypothese, Voraussetzungen, Probleme in der Biologie."

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[1] This interesting and concise account of the proceedings of the Vienna Congress by Prof. Charles R. Barnes, is reprinted from the July number of the *Botanical Gazette.*

The proceedings, particularly as they relate to botanical nomenclature, are not only of interest to botanists, but are also of interest to pharmacists, as the true botanical origin of drugs is a question in which they are especially concerned. Fortunately, the botanical nomenclature adopted in the Pharmacopœia has not been unduly influenced by the more radical views on this subject. In following Engler and Prantl, in the main, the botanical nomenclature of the new Pharmacopœia is thus in line with the action of the congress just closed, and further changes in nomenclature are not likely to be made until after the meeting of the Pharmacopœial Convention in 1910.—EDITOR.

In the afternoon the Nomenclature Conference organized in the hall of the Museum in the Botanical Garden by electing as President, Flahault; as Vice-Presidents, Rendle and Mez; and three secretaries; received the report of the standing committees and of the Rapporteur-Général (Briquet); and adopted rules of procedure. The report of the Commission was presented as a quarto of 160 pages, having the text of the code of 1867 in the first column, the new formal proposals of various bodies in the second, notes by the Rapporteur in the third, and the text recommended by the Commission in the fourth. This *texte synoptique* was the work of Briquet, whose arduous labors for the past five years thus made possible the revision of the rules of nomenclature by this Congress. His untiring industry, unfailing patience, uniform courtesy and impartiality, as well as his linguistic facility, won the admiration of all.

Afternoon sessions thereafter, from 3 to 7 or even later, were devoted to the discussions and actions of the *texte synoptique.*

Morning sessions and on some days also afternoon sessions, which were held in the lecture-room of the Engineer-Architects' Club, were devoted to addresses upon special topics. Thus on Tuesday there were six papers on the development of the European flora since the Tertiary period; two introductory, on the geographical problems by Peack (Vienna) and the botanical problems by Engler (Berlin), while Andersson (Stockholm) spoke specially for the Scandinavian peninsula, Weber (Bremen) for the North German lowlands, Drude (Dresden) for the mountainous region of central Germany, and Briquet (Geneva) for the alpine region.

On Thursday the topic was the present position of the doctrine of photosynthesis, Molisch (Prag) speaking of photosynthesis in chlorophyllous and Hueppe (Prag) in chlorophyll-free organisms, Kassowitz (Vienna) giving a short talk on photosynthesis from the standpoint of metabolism. After a brief intermission the general problems of regeneration were discussed by Goebel (Munich), Lopriore (Catania) presenting a more special paper on the effects of wounding on regeneration of stems and roots. In the afternoon there were papers by Arthur (Lafayette) on the classification of the Uredinales; by Istvánfi (Budapest) on the life history of *Botrytis cinerea,* and by Pettkoff (Sofia) on the algal flora of Bulgaria.

On Friday, Scott (Kew) spoke on the fern-like seed plants of the carboniferous flora; Lotsy (Leiden) on the influence of cytology on

taxonomy; and Hochreutiner (Geneva) on the Botanical Garden at Buitenzorg.

In the afternoon and on Saturday papers were mostly ecological: Beck (Prag), "The Significance of the Karstflora upon the Development of the Central European Flora;" Drude (Dresden), "Suggestions for an Agreement upon the Terminology of Phytogeographical Formations, and Terminology Used in the Cartography of Plant Formations;" Wille (Christiania), "Schübeler's Theory as to the Changes which Plants undergo in Acclimatization at Higher Latitudes;" Tanfiljeff (St. Petersburg), "The Russian Steppes;" Tschermak (Vienna), "The Production of New Forms by Crossing;" Adamovic (Belgrade), "Phytogeography of the Balkan Peninsula;" Palacky (Prag), "Genesis of the African Flora;" Kurtz (Cordoba), "The Fossil Flora of Argentina;" Borbás (Klausenburg), "The Stipas of Hungary;" Hua (Paris), "Report on the establishment of a new international organ for the Publication of New Names;" Schindler (Brünn), "Regulatory Processes in the Plant Body in Relation to Cultivation."

On Wednesday a meeting of the Association Internationale des Botanistes was held, at which reports of the treasurer and secretary were presented. The most important action taken, by an overwhelming majority, was the direction of the Executive Committee, as soon as the present contracts permit, to print all *résumés* in type of the same size, abandoning the attempted discrimination. The next meeting will be held in Montpellier in 1908. The new officers are: Wettstein, president; Flahault, vice-president; the present secretary and treasurer were re-elected.

The botanical exposition, under the auspices of this Association, occupied the Orangery at Schönbrunn, the Emperor's summer palace on the outskirts of the city. The horticultural exhibit was open only during the week of the Congress, but the other exhibits remained for two weeks. There was an historical section, comprising books, atlases, original drawings, engravings, portraits, busts, herbarium specimens, instruments, and preparations of historical interest. This portion of the exhibit was limited to Austria, and naturally the most important contributors were the botanical section of the Imperial Museum of Natural History, and the two botanical institutes of the university.

The largest section of the exposition consisted of modern appli-

ances for instruction and research. With many of the instruments demonstrations were given daily (10–12). In this section were shown living cultures of algae, fungi, and bacteria; photographs of plants and plant-formations, and microphotographs of immense variety and all sizes, including many lantern slides; drawings and paintings; wall charts and maps; current books by the publishers; exsiccatae; and apparatus of many kinds (microscopes and their accessories), balances, ovens, and baths, glassware, physiological instruments, seed-control and wood-testing appliances, etc.

Particularly noteworthy in this section was a display of materials actually used in the Realschule and Gymnasia for botanical instruction, "whose purpose," the exhibitors say, "is to put before the eyes of visitors the advance which botanical instruction has made in the last decades. . . . Inasmuch as the phenomena of plant life must be brought close to the interest and understanding of pupils there stands in the foreground of the display the apparatus for conducting experiments in plant physiology, which break the path for the understanding of biological processes. Then come models and preparations for elucidating the anatomical and morphological features. . . ." This exhibit shows clearly how thorough and wise the courses are. The equipment puts to shame all of our high schools and nine-tenths of our colleges.

The unique mechanical balances of Němetz; the living algal cultures of the Biological Station in Vienna; the apparatus and methods of the Imperial Seed-control Station in Vienna, and of the Imperial Forestry Station in Mariabrunn; and the display of pure cultures of fungi by the bureau established for this purpose by the Association Internationale des Botanistes (in Utrecht, in charge of Prof. F. A. F. C. Went), deserves special mention. The attempt of the Association to secure an exhibit of separates and works of many writers was practically a failure, only eleven sending papers. As a whole the exhibition was highly interesting and useful.

The third meeting of the Freie Vereinigung der Systematischen Botaniker und Pflanzengeographen also occurred on Wednesday, at which, in addition to a considerable list of papers, there was held a discussion on the introduction of a uniform nomenclature in phytogeography.

On Friday the agricultural botanists came together in the Imperial Station for seed-control, in the Prater. No papers were read, but

discussions were held on several topics, such as: "Methods of investigating sugar-beet seeds," "Weighing methods in determinations of germinative capacity," "Organization in seed-control stations," "Culture and study of barley," etc.

The actions on nomenclature are too extensive to summarize, and only a few of the more important decisions can be mentioned here. The word *laws* is to disappear, *rules* and *recommendations* taking its place. The rules for nomenclature of "cellular cryptogams," *i e.*, the Bryophyta and Thallophyta, are remanded to a special commission of specialists, which is to present recommendations to the Congress of 1910, to be held at Brussels. In like manner a report on rules for the nomenclature of fossil plants is to be made by a commission of paleobotanists. The word *ordo* (order) displaces *cohors*, recommended by the Commission for a group of families; but the American proposition to substitute *phylum* for *divisio* was lost. The date 1753 Linn. Sp. Plant. ed. 1. was adopted by a vote of 150 to 19. A vote on an article permitting laxity in the application of the rule ot priority to generic names, and providing for a list of genera to be maintained *en tous cas*, was 133 yeas, 36 nays. Later, Harms's list of such genera (400 and over) was adopted by a vote of 118 to 37. This list had been referred to a committee composed of Bonnet, Harms, Britton, Prain, and Briquet, and was recommended (by a majority) for adoption. Some amusement was caused by the proposal of two corrections by the author while the motion to adopt was pending.

The proposition to except some old family names for the rule requiring such names to be derived from an important genus was carried by only 101 to 62.

The voting in regard to publication of a new species by plates and exsiccatae was confused, and the article was referred back to the Commission for editing. It is intended to exclude as valid publication *in future* plates without diagnoses, and past plates (without diagnoses) which contain no analytic drawings. Citation in synonymy and accidental mention are also declared invalid as publications. It was agreed (184 to 2) to adopt the compromise reported by a conference committee requiring the name of a section or species when transferred to another genus, or the name of a variety when transferred to another species, to be preserved or *re-established;* but when the rank is changed the preservation of the name is optional,

and if not preserved its later re-establishment is not permissible. This is accompanied by a *recommendation* to preserve the primitive name whenever possible.

The vote on the use of double names (like *Linaria Linaria*) was unexpectedly close; 116 against them and 72 in favor. Generic names differing merely by their last syllable and even by one letter will be retained. Only typographic or orthographic corrections may be made in generic names.

After January, 1908, diagnoses must be written in Latin; so a close vote, 105 to 88, decided on Friday. A vote to reconsider was made on Saturday but was lost, 125 to 56. The metric system is recommended, and it is declared that "the foot, inch, line, pound, ounce, etc., should be rigorously excluded from scientific language." Fathoms, knots, and marine miles likewise fall under the ban. Authors are requested to indicate clearly the scale of magnification of figures.

On the whole the action of the Congress was conservative from the American point of view, yet marks great progress toward a stable nomenclature. Our European friends have not yet grasped the idea of generic types, and the rules relating to genera will doubtless be the next region of advance. When the final editing is accomplished and the new code is available, we may reasonably expect the rules to be generally followed until a further revision is possible.

The work on cryptogams and fossil plants will doubtless be prosecuted with vigor. The Commission of Cryptogams consists of Migula, Lister, Lauterborn, Gomont, Wille, Nordstedt, Wildeman, Sauvageau, DeToni, Chodat, Farlow, Arthur, Magnus, Saccardo, Patouillard, Jaczewski, Marshall-Ward, Vuillemin, Atkinson, Bresadola, Clements, Golenkin, Hua, Malmö, Zahlbruckner, Schiffner, Stephani, Levier, Evans, Cardot, Brotherus, Fleischer, Mrs. Britton, Salmon, and a few others whose names could not be secured. Some others could profitably be added to the list.

The entertainments, excursions, and visits to various institutions were numerous and attractive. A reception by the Emperor was arranged, but the death of Grand Duke Josef on Tuesday estopped that, as well as a reception by the burgomeister at the Rathaus. Various long excursions after the Congress were provided, and all were sufficiently patronized to be undertaken.

The Committee of Organization and the various local committees are to be congratulated on the success of their arrangements. These quinquennial international congresses may now be considered a fixed feature of the botanical world. C. R. B.

A RETROSPECT OF PHARMACY WITH A HISTORY OF AN OLD PHILADELPHIA DRUG HOUSE.

By Samuel Troth.

We are living in an age of rapidity of thought and action; discovery is no longer localized nor limited by national dialect, but is heralded with lightning speed over the globe, translated into all languages and publicly displayed among all peoples.

Thought-interchange through the medium of printed literature, so scarce and highly prized by our grandfathers, has become plenty and commonplace, and our boys and girls are thinking out problems which would have puzzled men of olden time.

Higher education is the plea of the students, and old systems of philosophy are studied with respect to truth rather than revered by reason of antiquity.

New things attract, but only as they lead up to practical advancement, and the community is coming into a keener knowledge of the secrets of nature by applying such new light to the promotion of bodily comfort and mental improvement. Modern civilization is moved by a desire for financial profit, and individual selfishness is alive to such discoveries and improvements as may have a commercial value.

In no country is this more evident than in ours, where wealth has increased to such a degree that property has accumulated faster than population. Institutions of learning have been supported from this surplus, and opportunity is offered of free scholarships and liberal terms for education in the Arts and Sciences to those who wish to learn.

Pharmaceutical knowledge by technical instruction has become a positive science, and old-time charlatanism is shorn of its influence.

Newspaper advertisements like this from the London *Gazette* of 1673 were common to those days:

"These are to give notice that the eminently successful medicine, commonly known by the name of Dr. Goddard's Drops, are now

most faithfully prepared by Dr. C. G., to whom the said medicine and method of using was long since communicated by Thomas Goddard, Esq., nephew to the said Dr. Goddard, to whom alone (except to His Majesty) the whole receipt of making the medicine was communicated. The said medicine having been these twelve months in preparing, is now to be had in St. John's Close, at the House where Dr. Goddard lived and dyed, being the next door to the Star in the Passage to Clerkenwell."

This medicine of Dr. Jonathan Goddard purported to be a preparation of hartshorn with portions of the skull of a criminal who had been hanged, mingled with dried vipers' bodies and other peculiar substances not disclosed. It had an enormous sale and the recipe was sold to King Charles II, of England, for £5,000 sterling.

It is interesting to study history in its relation to scientific colonization along the line of what are termed seats of learning. Cambridge and New Haven became pioneers in college education devoted to the study of general literature, but Philadelphia was the cradle of medicine and pharmacy, and from its colleges have gone out men of power to foster like institutions elsewhere.

The history of pharmacy in Philadelphia is intimately connected with the conditions of settlement in the colony of Pennsylvania. At that time London was the great commercial metropolis, and many of her merchants were associated in business interests with those of Penn's growing city upon the Delaware, so that Philadelphia became the principal mart for English wares, and the drug trade flourished in a fertile soil. Old files of our newspapers picture these conditions as thus set forth:

"Imported in the last vessels and to be sold Wholesale and Retail at the very lowest prices, by

CHARLES OSBORNE,

Druggist from London, at the Golden Pestle, opposite Mr. Joseph Trotter's in Second Street."

"A large assortment of Druggs, chymical and galenical Medicines; also Daffy's Elixir, James' Powders, Bateman's Drops, Godfrey's Cordial, Anderson's Pills, Squire's Elixir, Spirits of Scurvy Grass, Bostock's Elixir, Lockyer's Pills, British Oil, Stoughton's Bitters, with Nipple Glasses, pots, pill-boxes, vials, &c., &c.

"N. B.—Masters of ships not carrying Surgeons with them may

be furnished with Medicine Chests and Directions. Families living distant from a Doctor may be furnished also with Chests of all sizes at very low rates."

"Townsend Speakman and Christopher Carter, Chymists and Druggists from London, on the north side of Market Street between Second and Third Streets," advertise their goods in detail, adding, "also a small quantity of very fine French plumbs and pruans, Muscatine raisins and Turkey figs."

"Imported and sold by

CHRISTOPHER MARSHALL,

At the sign of the Golden Ball near the Three Tun Tavern, opposite Strawberry Alley in Chestnut Street."

"A fresh and large assortment of drugs, chemicals and galenical medicines, Daffy's Elixir, Bateman's Drops, British Oil, James' fever powders, Stoughton's Bitters, Hooper's female pills, Schwanberg's fever powders, Godfrey's Cordial, and preparations for the Stone and Gravel, fine and common flour of mustard. Also most sorts of oils and colours either for ship or house painting, dry or ready ground, viz., carmine, vermillion, prussian blue, drop lake, masticotes, verdigrease, Dutch, English and rose pinks, white and red lead, yellow oker, Spanish brown, whiting, litherage, Venetian red, lampblack, with varnishes, brushes, tools, gold and silver leaves & shells; with sundry sorts of dye stuffs as madder, ground redwood; likewise

Bristol and London crown glass of most sizes, vials, galley pots, lancets, pill boxes, alum, brimstone, copperas, rosin and glue, with a great many other things too tedious to mention."

Some of Christopher Marshall's bills of lading mention casks of medicines to Silvanus & Timothy Bevan, at London; flour, wheat, corn, bread and pork to Lisbon; fish to Jamaica; 5,025 horns in one invoice to Dublin; linseed oil, turpentine, white lead, beeswax and rum to other ports.

Distinguishing signs of a London character were popular in the drug trade. Say & Bartram, afterwards Isaac & Moses Bartram, "at the Sign of the Bottle and Three Bolt Heads in Second Street a little above the Sign of the George;" and later Isaac Bartram, "Chymist and Druggist is lately moved into Third Street between Market and Arch at the Sign of the Unicorn's Head."

William Drewet Smith, "Late Apothecary to the Pennsylvania Hospital at his store, the Sign of Hippocrates' Head, between Chestnut and Market Streets."

William Smith, "at the Rising Sun in Second Street between Market and Chestnut and next door below Jonathan Zane's."

Sharp & William Delaney, "at Fothergill's Head on the west side of Second Street between Chestnut and Market."

Townsend Speakman, "at the Bell and Dragon, Four doors below the Friends' Meeting House on the west side of Second Street." Samuel Emlen, "at the Golden Heart, High Street." John White, "at the Mortar and Dove on Second Street." William Chancellor, "at the Pestle and Mortar on Market Street opposite the Presbyterian Meeting House." John Sparhawk, "at the Unicorn and Mortar on Market Street between Front and Second. Duffield & Delaney, "at the Boerhave's Head, Second Street near Walnut."

In 1773 Moses Bartram, "in Second Street between Arch and Race, three doors above Thomas Say's and opposite Samuel Miles and Michael Hillegas," in a *nota bene* to his drug advertisement, "wants to purchase a good smart Dutch lad about 13 or 14 years of age."

In 1730 Evan Jones, a druggist, was located on the north side of High Street near Third, at the sign of "Paracelsus' Head." A few years after he sold out to William Shippen and removed to the corner of Letitia Court, where he displayed a "Blue Paracelsus' Head," but subsequently took it down and put up the "Blue Oyntment and Galley Pot."

This same Evan Jones was principal in an affair that was the subject of town-talk and serious results. Daniel Rees, his apprentice, was interested in the current stories of the mysteries of Free Masonry, so Mr. Jones and some friends, from a spirit of fun, offered to show him the character of the initiation ceremonies of the Order. They had him led blindfolded into the cellar of the shop one evening, where the party, disguised as devil's imps with horns and other appropriate insignia, were assembled around a pan of blazing alcohol. When his eyes were uncovered they attempted by their antics to terrify him, and in the scrimmage his clothes caught fire, and he was so badly burned that he died a few days after. This led to a judicial trial for manslaughter and Jones was convicted and sentenced to be officially burnt in the hand, but a lawyer friend of his, a certain John Remington, interceded and procured his pardon.

In England the Church, through the Order of Monks, claimed a right to the monopoly of healing the body as well as the soul. Then came the Guild of Barber-Surgeons, who procured Acts of Parliament giving them special privileges; these were followed by the College of Physicians and the Fraternity of Apothecaries, each attempting to regulate trade relations by laws favorable to their respective interests.

Although the sale of drugs, by the beginning of the nineteenth century, was a leading interest in the general business of this city, there had as yet been no practical co-operative effort to introduce the London idea of guild or fraternity as a trade protection and stimulus.

In Philadelphia the University of Pennsylvania was at this time the leading educational institution. Under the direction of Dr. John Morgan it had introduced a medical department, which may be said to have taken a leading part in the medical teaching in the young Republic. Possibly to increase influence and to forestall others taking advantage of the indifference of the drug trade to its own interest, they instituted a pharmaceutical department, the history of which is given by Dr. George B. Wood, in 1827, as follows:

"The degree of Master of Pharmacy was instituted with the very laudable view of improving the profession of the apothecary, which in this city has assumed an importance far beyond what it possesses in other parts of the United States. Any person is entitled to the degree who shall have served an apprenticeship of at least three

years with a respectable apothecary, and attended two courses of lectures on chemistry and materia medica in the University.

"Advantages would no doubt have accrued from this accession to the original plan of the medical department had it not been superseded by the establishment by the apothecaries themselves of a distinct school, which, being under their own management and directed to the one object of advancing the usefulness and respectability of the profession, is naturally more popular and at least equally efficient."

Here we are given a hint of the difficulties that were to be met by the founders of the College of Pharmacy in combating a rival, which, profiting by the neglect of the drug fraternity, had already inaugurated a pharmaceutical department before any measures had been taken to supersede, as expressed by Dr. Wood.

In this movement Henry Troth and a few leading druggists were most active, and much credit is due him and his brother, Samuel F., for their persistent efforts through the early years of the college in pushing the work and reviving flagging interest.

To the historian belongs the labor, as typified by Scott's "Old Mortality," of restoring the time-worn records of the past, and in this spirit a brief account of an old Philadelphia drug house and its times may be of some interest to a younger generation which is prone to complain of hard work and long hours, by bringing to their view a picture of the greater hardships to which their forbears were subjected.

Henry Troth came from Talbot County, Maryland, in 1811, to serve a five years' apprenticeship with Jeremiah Morris, a retail druggist on the north side of Market Street west of Seventh. At the termination of his apprenticeship he, in partnership with his brother-in-law, Edward Needles, bought the stock and fixtures of Joseph Lehman, who for sixteen years had carried on a thriving drug trade at No. 222 Market Street, south side east of Seventh, the retiring merchant uniting with Peter Lehman at No. 320, between Ninth and Tenth.

Here was established the wholesale drug business under the firm name of Henry Troth & Co., which continued in the Troth family nearly fifty years.

The late war with England had ended, peace was declared, business was booming, profits were large, and by pressure of thrift and economy capital increased.

In 1823 Samuel F. Troth entered the firm, and in 1826 he bought the interest of Edward Needles and the business was continued as Henry Troth & Co. In 1836 they built upon the lot adjoining westward, a five-story building, the highest at that time occupied by any single firm on Market Street. The ground was bought from Moses Cox and was part of the old Hilzheimer property. The vacated building, No. 222, was bought by William Weightman and occupied by George Miller, confectioner.

In the new quarters, No. 224, the business was enlarged, employing an unusual number of apprentices for the times, and, venturing larger operations, soon attained front rank in the wholesale trade of Philadelphia. By care in selection and manufacture they were enabled to maintain the reputation which had been their aim from the beginning, of dealing in none but unadulterated drugs of the best quality in the market, unaided by false statement or exaggerated praise. In this they were also particularly fortunate in the friendship of Mr. George D. Rosengarten, the celebrated chemist, whose noted chemical preparations were in constant demand and commanded the highest prices, so that the Troth label became a mark of integrity wherever their goods were offered for sale.

In 1842 the senior partner died and the firm was changed to Saml. F. Troth & Co. by the association of Wm. P. Troth, the eldest son of Henry, with his uncle.

In 1853 Saml. F. Troth retired and the business was continued as Wm. P. Troth & Co. in connection with a younger brother, Henry M. Troth, who had graduated from the College of Pharmacy in 1851.

In the early days the wholesale druggists compounded many of the officinal articles now turned out from large factories, upon which the apprentices were kept busy in the shop. In a shed back of the old store, No. 224 Market Street, was a large stone mortar, in which the mercurial ointment was made by the comminution of the mercury by a long-handled heavy pestle, the top steadied by a crossbar with a collar, while the pestle was moved by hand-power, and after a day's work with the mercury, lard and tallow, about 25 pounds of the combination was completed.

A large cask also stood in the shed with the ingredients of sulphate of iron, nut galls, gum arabic, extract of logwood, vinegar and water to form a first-class writing ink.

Then the busy times with other compounds, as opodeldoc, Lee's, Anderson's and Hooper's pills, Dalby's carminative, Wistar's cough lozenges and the various essences, lemon, peppermint, cinnamon, etc.

An old drug label, reproduced on page 425, gives an idea of the peculiar style of advertising, common to popularize preparations put upon the market. It is printed from a copper plate, engraved by Samuel Tiller, one of the best engravers of Philadelphia, and portrays a lady and gentleman in the costume of the period admiring the natural beauty of a cascade, the white foam from the tumbling stream suggestive of the effect which may be expected to follow the "mix which is to be drank immediately," according to the directions attached.

The Troth store for many years became a favorite shop for the practical education of apprentices, numbering among its protégés some who subsequently were counted leading druggists of the city.

A few called to mind were Alexander Dawson, Robert B. Potts, Claudius B. Linn, Clement Cresson, Thomas Mitchell, Peter Troth Wright, Richard M. Kirkbride, James Norris Dixon, John Paul, Joseph Trimble, Armon Davis, Jacob Lybrand Smith, Wistar C. Parsons, Alonzo W. Parsons, Samuel Yarnall Kemp, Samuel Bines and John F. Sheaff.

The block from Sixth to Seventh on Market Street was a very busy location in the early thirties. At the southeast corner of Seventh was the grocery store of Gillespie & Ellmaker and Gillespie & Jones, and at the opposite corner across Seventh, where the bank now stands, was that of Simon Gratz; these were headquarters in that location for the four- and six-horse Conestoga wagon transports to Pittsburg.

Those long, white canvas-covered vehicles, drawn by fine, sturdy horses bedecked with showy harness and sets of open-mouthed clapper, jingling bells attached to the hame tops, were a feature among the old Philadelphia customs still remembered by many yet living, but to the younger generation, accustomed to fast freight transportation, it seems almost inconceivable that our commercial interests could have flourished while dependent upon twenty-one days' merchandise carriage to Pittsburg.

Next to the Gillespie's store on the east was J. K. Eyre, grocery and forwarding house; then came Perry O'Daniel, watchmaker; Henry Troth & Co.; Geo. Miller, confectioner; J. B. Barras, cloth-

ing; Isaac M. Ashton, hats; Ellmaker, Dunn & Co., forwarding house, corner of Decatur Street, the old building still standing with the old-time hoist projecting from the top of the second story into Decatur Street. Across from Decatur was J. Ridgway & Son, clothing; Reeves & Whitaker, nail manufacturers; Meredith Henderson & Co., drugs; Robert Steen & Co., grocers; Red Lion Tavern, W. M. Shewell, shoes; A. Elmes, hats, and Daniel Deal & Co., on the corner of Sixth Street.

Among others on the north side of Market Street in the same block were R. M. Reeve, drugs; Wm. Carman, grocer; Mulford & Alter, grocers; J. B. Rowand, patent medicines; R. P. DeSilver, books; Wm. Wayne, hardware; Peter Wright & Son, china; Saml. Bispham, grocer and forwarding; Wm. Musser, hides, oil and leather; Geo. Steinmetz, brushes, and Watson & Rennels, confectionery.

Around the corner of Market, on the east side of Seventh, there stood, until a few years ago, an old grayish-brown painted brick house, with a peaked roof and garret over the third story. John Stock built the house in 1788. He had been brought from Germany as a lad about 1765 by Christopher Marshall, with whom he served a nine years' apprenticeship in consideration of the cost of his passage to this country. In 1796 Mr. Stock put up another building at the rear, on Decatur Street, then known as Hiltzheimer's Alley, which he used as a paint shop, the store on Seventh Street being devoted to his drug trade.

In 1814 Geo. Gardom, then a lad, entered the employ of Mr. Stock, and in a conversation a few years ago the old man told how his employer often referred to the service with Mr. Marshall, and thought that he had well earned the £18 cost of his passage to America, and although his master had clothed him well he never sent him to school, which he regretted as an unnecessary deprivation, so Gardom, as a joke, wrote these lines and laid them on Mr. Stock's desk:

Nine years I served
For £18 and better;
The clothes I got were good,
But of learning not a letter."

Mr. Stock died in 1823, and Geo. Gardom bought the building, which he occupied as a drug and paint shop until he died.

Thus looking backward we not only tell a tale of passing interest,

but by such revival we learn from the recital of past conditions the steps by which advancement has been attained through the labor of those who have helped to make it.

The Philadelphia College of Pharmacy, the pioneer in pharmaceutical education, is well worthy of our civic pride, and the old drug house, with its half-century of active life, has been intimately connected with its early years.

The Troth scholarship is a fitting tribute to the work of its proprietors, and a continuous memorial of their fidelity to the college and the profession they honored.

Almost a century has passed since the druggists of Philadelphia, believing that the University of Pennsylvania was attempting interference with their rightful position in the business world, inaugurated the movement that culminated in the establishment of an institution devoted solely to the furtherance of their own profession, and right well has the promise of the founders been fulfilled in the result of eighty odd years of resourceful activity.

To meet and keep pace with this progressive action, the college must face the necessity of increased zeal on the part of its friends, involving an expenditure beyond any heretofore contemplated.

May the spirit of its founders actuate its governors to hold the prestige already gained, and keep their alma mater in the forefront of the profession, is the hope of the writer.

NOTES ON BRITISH PHARMACY.

By F. A. Upsher Smith, Pharmaceutical Chemist.

The forty-second annual meeting of the British Pharmaceutical Conference was held at Brighton from July 24th to 27th. The conference has for its objects the encouragement of pharmaceutical research and the promotion of social intercourse among pharmacists. The mornings and afternoons of two days are devoted to the reading and discussion of papers, and the remainder of the time is given up to enjoyment. On the occasion of the recent conference nearly 300 pharmacists and many ladies from various parts of the kingdom and the Colonies were entertained in lavish fashion by their confrères of Brighton and the neighboring sea-coast town of Eastbourne. A mayoral reception in the beautiful Royal Pavilion,

dances, smoking-concerts, drives and a sea trip to Eastbourne enabled the members to pass an enjoyable time.

The scientific side of the conference was well attended to, and the meetings were presided over by Mr. W. A. H. Naylor, F.I.C., president of the conference. A notable feature of the meetings was the welcome presence of the veteran Dr. John Attfield, F.R.S., after his absence during the last year or two, owing to a severe illness. About twenty papers were read, of which brief notes will now be given.

The Composition of Dentifrices. By Mr. Stanley Read, L.D.S.E.—The researches of Dr. Miller, of Berlin, have proved the presence in the mouth of protective as well as harmful bacteria. From this Mr. Read drew the conclusion that antiseptic substances should not be employed in dentifrices, but it did not appear to find favor with the members of the conference.

The Physiological Standardization of Drugs. By Prof. W. E. Dixon, M.D. (Lond.), M.A. (Cantab).—Professor Dixon dealt with the necessity for standardizing those galenical preparations which do not admit of chemical assay. He showed how commercial drugs vary in strength, and none more so than ergot. He cited the following drugs as suitable for assay by bio-chemical means: The digitalis group, including digitalis, strophanthus and squill; ergot, Indian hemp, lobelia and opium. Professor Dixon criticized adversely the standardization of ergot preparations on the rooster. He preferred injecting ergot into the femoral vein of a frog and observing the blood pressure at the carotid artery. The rise in blood pressure in mammals, due to ergot, is directly proportional to the effect of ergot upon the uterus; whereas the production of gangrene in the comb of a rooster is not so. In the discussion that followed some apprehension was manifested as to the ability of pharmacists to carry out such tests, but Professor Dixon made it clear that such work was quite outside the province of the pharmacist.

The Pharmacy of Capsicum. By Mr. A. W. Gerrard.—The author proved 90 per cent. alcohol to be a better solvent of capsicum than ether, benzine, chloroform and several other organic solvents. He suggested the preparation of a liquid extract (1 grain equals 2 grains powdered capsicum) as the starting point for making capsicum ointment, wool and plaster. Mr. Gerrard's formulæ are here given:

Liquid Extract of Capsicum: Prepared by percolation of capsicum fruit in No. 60 powder, 100 parts with 90 per cent. alcohol, and the liquid distilled until the extract weighs 50 parts.

Ointment of Capsicum: Liquid extract of capsicum, 60 grains; olive oil, 1 ounce; spermaceti, 60 grains. Melt the oil and spermaceti together, stir in the extract, and allow to cool.

Lanolin Ointment of Capsicum: Liquid extract of capsicum, 60 grains; hydrous lanolin, 1 ounce and 60 grains. Melt the lanolin with gentle heat and stir in the extract.

Capsicum Wool: Liquid extract of capsicum, 2 ounces; absorbent cotton in thin sheets, 9 ounces; 90 per cent. alcohol, 7 ounces. Dissolve the extract in the alcohol, soak the cotton with the solution under pressure. Dry the cotton, which should contain 10 per cent. of solid extract. Color with eosin.

Capsicum Plaster: Liquid extract of capsicum, 10 parts; resin plaster, 95 parts. Evaporate the spirit from the extract over a water-bath, then stir it into the melted plaster. Color with dragon's blood.

Other papers read at the conference included: "Compound Tincture of Gentian," by Mr. F. H. Alcock, F.I.C., relating to the variation in amount of total solids, due to the variation in the root.

"Note on the Ash of Myrrh," by the same author.

"Commercial Concentrated Infusions," by Mr. R. A. Cripps, F.I.C., showing the inferiority of concentrated infusions as regards color, taste, odor and extractive, as compared with freshly made infusions.

"Compound Decoction of Aloes," by the same author, pointing out the undesirability of the concentrated form of this preparation, and the deficiency in alcohol of commercial samples.

Standardization in the New U.S.P. By Mr. T. Maben.—Mr. Maben drew attention to the extension of the principle of chemical standardization and compared the figures obtained in this country with standards given in the U.S.P.

Quinine Acid Hydrochloride. By Mr. W. Garsed.—Mr. Garsed drew attention to an important fact that seems to have escaped the attention of manufacturers, viz., that the salt is almost anhydrous.

"The Assay of Compound Tincture of Camphor," by Mr. F. C. J. Bird, pointing to the need for special care in assaying this preparation. The author gave a detailed method for operating on so small

a quantity as 2·5 c.c., for use in legal cases when larger quantities are not available.

"Nux Vomica Seeds," by Mr. Sidney C. Gadd, giving the amount of N / 10 soda required to neutralize the fat in the seeds.

"Manufacture of Ferrous Carbonate," by the same author, describing the manufacture of dry ferrous carbonate, containing 60 per cent. of the ferrous salt.

"Castor Oil" (Part I), a resumé of the chemical literature of the subject, by Mr. H. Finnemore, A.I.C., and Mr. H. Deane, B.Sc., A.I.C.

"Amateur Laboratory Construction," by Mr. Evelyn W. Pollard, B.Sc. A description of cheap forms of home-made apparatus, including a still with an electric alarm to give warning when the still is running dry. This device consists of a metal disc attached to a cork, which acts as a float in the constant level tube. As the water distils the float falls until it reaches another metallic disc, when by means of wires attached to the discs a circuit containing an electric bell and a Leclanché cell is completed and the bell rings.

"Viscosity of Mucilages of Acacia and Tragacanth," by Mr. Edmund White, B.Sc., F.I.C., who finds that the viscosity of a mixture of these gums is less than might have been expected from the proportions of the two gums present. This phenomenon requires further investigation.

"Arsenious Iodide," by Mr. R. C. Cowley and Mr. J. P. Catford, consisting of notes and criticisms on methods of preparing the salt and on the official tests. A method of preparing the salt by direct combination is recommended. The new U.S.P. reproduces an erroneous statement regarding the neutrality of solutions of the salt.

PROGRESS OF PHARMACY.

A QUARTERLY REVIEW OF SOME OF THE MORE INTERESTING LITERATURE RELATING TO PHARMACY AND MATERIA MEDICA.

By M. I. Wilbert,
Apothecary at the German Hospital, Philadelphia.

By far the most important occurrence, during the past three months, from a pharmaceutical point of view, was the publication of the new *eighth decennial revision of the Pharmacopœia of the United States of America.* An exhaustive preliminary review of this publi-

cation has appeared in this JOURNAL (A. J. P., 1905, page 351), and corresponding reviews have been, or are being, published in other pharmaceutical journals. It is gratifying indeed to note the general appreciation of the book, as voiced in the different reviews, and the spirit of unanimity with which the work of the Committee on Revision is being commended.

The general appearance of the book itself, the paper, printing, and the typographical arrangement of the text, have all been highly commended, and in this respect alone the Board of Trustees of the United States Pharmacopœial Convention have amply demonstrated a reason for their existence. The only possible fault that might rightfully be found with the eighth decennial revision of the U.S.P., as a book, is to be noted in connection with the volumes that have been bound in sheep. The shortcomings of this particular type of binding have evidently been brought to the attention of the Secretary of the Board of Trustees, as they are referred to at some length in a circular letter recently sent out. In this same letter, Dr. Motter calls attention to the fact that volumes bound in full flexible leather are much more satisfactory and much more durable than any other form of binding and that they will, in addition, lay perfectly flat and "stay put" at any portion of the book at which it may be opened. At the prescription counter, or in the laboratory, this is a most important feature, and prospective purchasers of the Pharmacopœia will, therefore, do well to remember that the binding in full flexible leather is the most durable as well as the most satisfactory in other respects, and that the sheep-bound book, although intermediate in price, is not satisfactory for every-day use.

Among the numerous pamphlets that have been published descriptive of, or commenting on, the Pharmacopœia, at least two deserve more than passing notice. The first of these to reach us is of English origin: *A Synopsis of the Principal Changes in the United States Pharmacopœia* effected by the Eighth Decennial Revision, 1900, official from September 1, 1905, compared with that of 1890 and the British Pharmacopœia, 1898. By W. Harrison Martindale, Ph.D. Price, 2s.; post free, 2s. 1d. London, Eng.: H. K. Lewis, 136 Gower Street, W. C.

In this very interesting little pamphlet of 36 pages Dr. Martindale has attempted to indicate briefly the most important changes that have been carried out in the eighth decennial revision of the

United States Pharmacopœia, and to compare them with the British Pharmacopœia now in use. That he has succeeded wonderfully well is evidenced by a careful study of the book, or rather booklet, itself, which is to be recommended to all who are in any way interested in the comparative study of existing Pharmacopœias.

The second pamphlet of interest in this connection is: Hygienic Laboratory. Bulletin No. 23, August 1, 1905, entitled: *Changes in the Pharmacopœia of the United States of America,* Eighth Decennial Revision. Official from September 1, 1905. By Reid Hunt and Murray Galt Motter. Washington: Government Printing Office. 1905.

This pamphlet contains a series of interesting comments on the properties and uses of the additions to the Pharmacopœia, also a number of tables relating to the changes in strength of the more important official preparations, a list of the changes in the official Latin titles of pharmacopœial preparations, a list of the articles dismissed from the Pharmacopœia; also a table of average doses, as given by the eighth decennial revision of the Pharmacopœia, and an index. The latter is particularly valuable and refers to a number of allied compounds that are mentioned in the comments on the new additions to the Pharmacopœia.

The fifty-sixth Annual Session of the American Medical Association, held at Portland, Ore., July 10–14, 1905, was of more than usual interest to pharmacists. In point of numbers the meetings were particularly well attended and the papers and other communications presented to the several sections were of the usual high order of merit.

Before the Section on Pharmacology, now changed to Section on Pharmacology and Therapeutics, several papers by members of the American Pharmaceutical Association were read and discussed. Prof. Albert Schneider, of San Francisco, read a paper entiled "Uncertain Origin of Many Drugs;" Prof. William M. Searby, of San Francisco, read a paper on "The U. S. Pharmacopœia—Its Functions;" and Prof. C. S. N. Hallberg, of Chicago, read a paper on "The U. S. Pharmacopœia. Advance in Pharmacy." A resolution endorsing the standards and the orthography of the U.S.P. was also adopted by this section.

In the Section on Practice of Medicine, Dr. Frank Billings, of Chicago, read a paper on "The Secret Nostrum Evil," in which he

contended that the best way to combat, and ultimately to eliminate, the present abuses in this connection was by publicity. Dr. Billings, it appears, is in favor of holding special society meetings to consider the evils of prescribing remedies of unknown composition and also believes that the utmost publicity should be given these proceedings, in order to educate the profession to a due realization of the dangers that are involved. The paper was discussed by Drs. Musser, Moore, Walsh, Stengel and others.

At the close of the discussion Dr. Alfred Stengel, of Philadelphia, presented a set of resolutions calling attention to the prevailing abuses in connection with secret or semi-secret nostrums and endorsing the action of the Board of Trustees of the Association in creating the Council on Pharmacy and Chemistry.

In the House of Delegates the action of the Board of Trustees in relation to the Council on Pharmacy and Chemistry was commended and the work that the Council itself has done was endorsed. (*Jour. Am. Med. Assoc.*, July 22d, page 276.)

Acetanilid Mixtures.—The Council on Pharmacy and Chemistry of the American Medical Association, through its sub-committee on chemistry, has published an official report on acetanilid mixtures. (*Jour. Am. Med. Assoc.*, June 3d, page 1790.)

The direct object in making the investigation was to ascertain the percentage proportion of acetanilid contained in each of the several preparations examined. Diluents and other constituents than those mentioned in the report were not determined. The substances reported on, and their percentage content of the substances mentioned, were:

Ammonal.—Acetanilid, 50; sodium bicarbonate, 25; ammonium carbonate, 20.

Antikamnia.—Acetanilid, 68; caffeine, 5; citric acid, 5; sodium bicarbonate, 20.

Phenalgin.—Acetanilid, 57; sodium bicarbonate, 29; ammonium carbonate, 10.

Salacetin.—Acetanilid, 43; sodium bicarbonate, 21; sodium salicylate, 20.

Kohler's Headache Powder.—Acetanilid, 76; caffeine, 22.

Orangeine.—Acetanilid, 43; sodium bicarbonate, 18; caffeine, 10.

That manufacturers of these compounds may, and actually do, vary the composition of these several mixtures was also evidenced

On page 1791 of the *Journal* it is stated that "Certain packages of phenalgin were purchased which on analysis did not show ammonium carbonate." On page 55 (*Jour. Am. Med. Assoc.*, July 1, 1905) it is stated that the examination of antikamnia and quinine tablets failed to show the presence of sodium bicarbonate, an integral constituent of antikamnia.

The Lewis and Clark Pharmaceutical Congress was held in Portland, Ore., July 12–14th. The several meetings of the Congress, while not particularly well attended, appear to have been satisfactory, and will no doubt prove to have been of material advantage to the progress of pharmacy on the Pacific Coast. A permanent organization was effected at the second session, when the following officers were elected: President, William M. Searby, of San Francisco; Vice-President, J. M. A. Laue, of Portland; Secretary, A. Schneider, of San Francisco; Treasurer, J. H. Dawson, of San Francisco.

The greater number of the *State Pharmaceutical Associations* have held their annual meetings. While it must be admitted that but few of these meetings have contributed much to the advancement of the professional side of pharmacy, they have, by maintaining at least the semblance of an organization in the several States, evidenced a tendency to preserve and to foster a spirit of amity and good-will that must, in the near future, be productive of higher ideals and better results.

The British Pharmaceutical Conference Meeting was held this year at Brighton, July 24–27th. It is rather a singular coincidence that the British Association should choose for its annual meeting place this popular seaside resort, while our own American Pharmaceutical Association, for the first time in its history, is to meet at Atlantic City, the most populous and undoubtedly the most popular seaside resort in America.

The subject matter of the papers read and discussed at the Brighton meeting was, in many ways, indicative of thoughts that are uppermost in the minds of active pharmacists throughout the world.

The President, Mr. W. A. H. Naylor, F.I.C., F.C.S., appears to have had a due appreciation of this widespread interest when he took for the subject matter of his annual address a critical discussion of the objects, aims and probable limitations of standardization.

Standards and Standardization.—In the course of his address on

this subject Mr. Naylor outlined the principles of standardization and also gave a short history of its practical application in Great Britain. After calling attention to a number of processes for standardizing the more popular alkaloidal drugs, he devoted some time to calling attention to the fact that standardized preparations, like all others, are subject to changes that may, and actually do, contribute to the loss of active principles, even when kept under the most favorable circumstances. In this connection he stated that preparations of nux vomica were undoubtedly the most stable while the liquid preparations of ipecac were the most subject to loss of alkaloidal content. Mr. Naylor also called attention to the fact that preparations that are made from standardized drugs may, and frequently do, differ very materially in alkaloidal content, and he therefore considers it unwise to rely absolutely on the alkaloidal indications of the drug without confirming them by a careful assay of the finished product.

At least three additional papers, presented at the Conference meeting, were largely devoted to the same subject. Dr. W. E. Dixon discussed the "Bio-chemical Standardization of Drugs;" Thomas Maben, F.C.S., read a very interesting paper on "Standardization in the new U.S.P.;" and Messrs. Umney and Bennett discussed "The Essential Oils of the United States Pharmacopœia." The latter paper contains a detailed review of the tests and requirements embodied in the several monographs on essential oils in the U.S.P., and is well worth careful perusal, particularly at this time. Dr. Dixon, in his paper on physiological standardization of drugs, argued that this method was altogether as reliable as chemical tests, and in some instances, at least, offered the only satisfactory method by means of which the potency and consequent efficiency of therapeutic preparations could be tested. (The *Pharmaceutical Journal*, July 22, 1905.)

The Metric System of Weights and Measures in Australia.—A bill has been introduced in the Parliament of the Federal Government of Australia which provides that the use of the metric system shall be permissible and that the Governor-General shall have power to make it compulsory at any future date. (*Phar. Jour.*, 1905, page 806)

The Coming of the Mil.—"The recent announcement that official recognition had been accorded to the proposed new terms for metric measures of capacity—the mil, decimil and centimil—raises fresh

hopes with regard to the prospect of the metric system of weights and measures being generally adopted in course of time for dispensing purposes in England. Those who devised and elaborated the system never had in view the prevailing rule, in English-speaking countries, of 'solids by weight and liquids by measure,' otherwise provisions would doubtless have been made for measuring smaller qantities of liquids than the one-thousandth part of a liter. In that case, we should not have seen the cubic centimeter adopted as a measure of capacity, nor would there have been any temptation to indicate doses of liquid medicaments in unthinkable decimal fractions of a fluid gramme. So long as the dose of Scheele's hydrocyanic acid was given as '0·06 to 0·24 c.c.,' so long would medical practitioners and pharmacists prefer to think and speak of it as '1 to 4 minims,' and there would have been an insurmountable barrier to the use of the metric system by English-speaking prescribers and dispensers. But the coming of the 'mil' alters the position entirely, since that term and those representing fractional parts of the milliliter will adequately and conveniently replace the fluid drachm and the minim. It is to be hoped that the new terms may be used freely in pharmaceutical literature, so that they may become quite familiar before the issue of the next British Pharmacopœia, in which the mil and its fractions will presumably be employed to the exclusion of less accurate denominations." ("GNOMON," in *Phar. Jour.*, July 8, 1905, page 32.)

The British Pharmacopœia.—Dr. Donald Macallister, in his presidential address to the General Medical Council, in referring to the coming revision of the British Pharmacopœia, said: "The Pharmacopœia Committee has decided that it is expedient to appoint committees of reference to advise it on points of chemistry, botany, pharmacology and pharmacy. With the courteous assistance of the pharmaceutical societies of Great Britain and of Ireland a committee of reference in pharmacy has first been appointed. It consists of expert pharmacists, with Mr. Hills as chairman and Professor Greenish as secretary, to whom questions relating to pharmacopœial pharmacy will be referred for investigation and report." (*Phar. Jour*, 1905, page 795.)

Amalgamation in Great Britain.—The Liverpool Chemists' Association has issued a circular to the chemists of the district stating that it is proposed to amalgamate the Liverpool School of Pharmacy

with the Liverpool University so as to obtain the advantages of the magnificent equipment of the University in addition to the admittedly excellent staff of teachers now connected with the School of Pharmacy. (*Chem. and Drug.*, 1905, page 780.)

That a desire to improve the educational facilities in all branches of learning is still foremost in the minds of a large number of eminent and scholarly men is evidenced by the sentiments expressed by *Dr. William Osler in his farewell address to the medical profession of America.* (*Jour. Am. Med. Assoc.*, Aug. 5, 1905, page 365.)

Unity, Peace and Concord was the text selected by Dr. Osler for this address. In speaking of the things needed to bring about the desired unity in the medical profession he laid considerable stress on the desirability and need of bringing about the consolidation of medical schools. Referring to the changed conditions in methods of instruction, he said: "Within the past twenty-five years conditions have so changed that the tax on the men in charge of the unendowed schools has become ever more burdensome. In the old days of a faculty with seven professors a school with 300 students was a good property, but the introduction of laboratory and practical teaching has so increased the expenses that very little is now left for distribution at the end of the year. The students' fees have not increased proportionately, and only the self-sacrifice and devotion of men who ungrudgingly give their time, and often their means, save a hopeless situation. A fusion of the school is the natural solution of the problem. . . . Even the larger schools of the larger cities could 'pool' their scientific interests to the great advantage of the profession."

Much of what Dr. Osler recommends to the medical schools is equally applicable to schools of pharmacy, and it is safe to say that we will not, in fact cannot, have the much-to-be-desired improvements in the status of pharmacy and of pharmacists until the income of the teachers of pharmacy is, in a large measure at least, entirely independent of the fees paid by students.

Additional Prerequisite Requirement.—The Wisconsin Board of Pharmacy has recently announced that after July 1, 1905, all candidates for examination must submit certificates showing that they have completed at least one year's instruction in a high school, or its equivalent; that after July 1, 1906, they must also submit certificates showing them to have completed one year of at least thirty-two

weeks in a school or college of pharmacy recognized by the Board; and that after July 1, 1907, they must present evidence of having completed a full college course.

Apprentices who were registered with the Board before July 1, 1905, are exempt from these regulations.

The Hanbury Medal, for original research in the natural history and chemistry of drugs, was this year awarded to Professor Ernst Albert Schmidt, the director of the Pharmaceutical Institute of the University of Marburg, a position he has filled for upwards of thirty-one years. (*Phar. Jour.*, 1905, page 863.)

Professor Schmidt is an honorary member of the Philadelphia College of Pharmacy, of the American Pharmaceutical Association, of the Pharmaceutical Society of Great Britain, and of a number of other pharmaceutical and scientific societies. He was awarded the Flückiger medal in 1902, and is generally well known for his contributions on the chemistry of the alkaloids.

Acetyl-Salicylic Acid.—The British patent for this substance was recently declared invalid by Mr. Justice Joyce, who, in handing down his decision, asserted that the specification for the patent was misconceived and therefore misleading. (*Phar. Jour.*, July 15, 1905, page 76.)

Another interesting decision, relating to this same chemical, was recently reported from Hamburg, Germany. Messrs. C. F. Asche & Co. were marketing "Acetylo-salicylic acid, a substitute for aspirin," and were proceeded against by representatives of the Farbwerke A-G vormals Friedrich Bayer & Co., in Elberfeld, for interfering with their rights in the trade-marked name and attempting to mislead the public. In view of the fact that the preparation under consideration was distinctly labelled as not being aspirin and was offered in vials quite distinct from those used for the latter, the court ruled that no fraud was intended and dismissed the case. (*Phar. Zeitg.*, 1905, page 618.)

The Cultivation of Medicinal Plants.—E. M. Holmes, F.L.S., has contributed an interesting series of articles to the *Pharmaceutical Journal* in which he describes the habits and the soil best suited to the growing of various medicinal plants.

In England medicinal plants are grown quite extensively, and, in some sections at least, on a very large scale. The prospects for this year's crops (*Phar. Jour.*, July 29, 1905, page 112) are unusually

good for some drugs, while others, particularly peppermint and lavender, will be below the average.

Rheum Rhaponticum in Chinese Rhubarb.—A. Tschirch (*Schweiz. Wochensch.*, 1905, page 253) describes a ready method for detecting the admixture of Rheum haponticum in other varieties of the drug. This method depends on the insolubility, in ether, of the crystalline principle rhaponticin or ponticin:

Ten grammes of the suspected powder are boiled for fifteen minutes with 50 c.c. of dilute alcohol, the resulting solution is then filtered and concentrated to 10 c.c., this concentrated solution is then mixed with 10 or 15 c.c. of ether and allowed to stand. If rhaponticin is present this will be precipitated as a crystalline deposit. Chinese rhubarb similarly treated gives no deposit.

The Constitution of Barbaloin.—H. A. D. Jowett and C. E. Potter have commenced an investigation of disputed points in connection with the constitution and the empirical formula of barbaloin. They have made a number of analyses of different specimens of carefully purified material, as a result of which they propose the adoption of Tilden's formula for barbaloin, $C_{16}H_{18}O_7$. The authors have been unable to confirm a number of statements made by Leger, in 1902, relating to barbaloin, and are inclined to believe with Oesterle that the work done by Tilden (1872–1875) more nearly indicates the true composition of this substance. (*Chem. and Drug.*, 1905, page 901.)

Hydrastis.—In Europe this rhizome has repeatedly been found to be contaminated, and in some cases undoubtedly wilfully adulterated, by the admixture of one or more of the following: Aristolochia Serpentaria, Leontice thalictroides, Stylophorum diphyllum, Jeffersonia diphylla, Trillium sessiliflorum. (*Zeitschr. d. Allgem. Oest. Apoth. Ver.*, 1905, page 542.)

Reliable Qualitative Test for Sugar.—J. Strassburger gives the following modification of W. S. Himes' test for sugar: Two grammes of pure cupric sulphate are dissolved in 15 c.c. of distilled water, 15 c.c. of glycerin are added, and the whole is then mixed with 150 c.c. of a 5 per cent. solution of potassium hydrate. For use 4 c.c. of this solution are heated to boiling and a few drops of the suspicious urine are added. In case an appreciable amount of sugar is present the characteristic red precipitate is promptly produced. While this reagent is not as sensitive as Fehling's solution it has

the advantage of being comparatively stable. (*Apothek. Zeitg.*, 1905, page 310.)

The Production of Extracts and Tinctures.—The most desirable methods for extracting drugs in the production of extracts and tinctures have received considerable attention recently in the pharmaceutical press of Germany. Among the contributors to the controversy are Dr. J. Herzog, Dr. Bruns, Dr. W. Lenz and others. The present status of the theory and practice of drug exhaustion in Germany has more recently been carefully reviewed in a lengthy article in the *Pharmaceutische Centralhalle* (1905, page 420, *et seq.*) by Dr. J. Katz. In this article the writer devotes considerable space to a critical review of the several methods that have been in use, or that have been suggested from time to time, for the preparation of extracts of organic drugs and practically agrees with Herzog, that, all things considered, percolation offers by far the most satisfactory method for the complete and at the same time economical extraction of drugs.

Acidol.—Betain hydrochloride, a colorless crystalline powder, acid taste and reaction, soluble in 2 parts of water and in 30 parts of 90 per cent. alcohol. Aqueous solutions of acidol are said to hydrolize rapidly and the substance then acts as pure hydrochloric acid. It is indicated as a substitute for hydrochloric acid and on account of its pleasant fruity taste is said to be more readily taken. Acidol may be given in aqueous solution, in tablets or as powder diluted with pepsin or inert materials. Dose, 0.50. (*Phar. Centralh.*, 1905, page 371.)

Indoform.—A white crystalline powder obtained by the action of formaldehyde on acetyl-salicylic acid. Indoform is sparingly soluble in water and has an acid astringent taste. It is decomposed by alkaline solutions, liberating formaldehyde. Indoform has been given in gout, rheumatism and neuralgia, in the form of tablets containing 0.50 of the substance. (*Phar. Centralh.*, 1905, page 316.)

Metakalin.—This name is applied in Germany to what appears to be a cresol soap solution in solid form. Metakalin is said to be composed of 80 parts of a pure metacresol-metacresol potassium combination and 20 parts of a hard soda soap.

When fresh the substance occurs as a white powder, but gradually becomes yellow on keeping. It is soluble in 1 to 2 parts of water, this concentrated solution becomes cloudy on the addition of water,

until from 9 to 10 parts of water have been added, when it again becomes clear. Indicated as a substitute for cresol soap solutions, or lysol. (*Viertel-Jahrschr. f. Pract. Phar.*, 1905, page 110)

Mukogen.—This is said to be the hydrochloride of dimethyl-phenyl-p-ammonium-β oxynaphthoxazin and is produced by the condensation of a dinaphthol with nitrosodimethylamin.

Mukogen occurs in blue crystals that are nearly insoluble in water but soluble in alcohol and in solutions of the alkalies. It is said to act as an aperient and is given in doses of from 0.10 to 0.30. (*Phar. Post.*, 1905, page 332.)

Tacca pinnatifida, the tubers of this plant, belonging to the family Taccaceæ and indigenous to the South Sea Islands and to New Guinea, are said to contain the greatest percentage of starch of any known plant; averaging, according to Wohltmann, as high as 28 per cent. The starch itself occurs in commerce as Tahiti arrow-root, Williams' arrowroot or as Fécula de Pia. (*Phar. Centralh.*, 1905, page 496.)

Petrolatum Ceratum.—P. Van der Wielen proposes the following formulas for petrolatum or vaseline compounds that are said to be capable of taking up, and permanently holding, as much as 75 per cent. of water or of aqueous solutions, and should, therefore, be satisfactory substitutes for adeps lanae.

Petrolatum Ceratum album.—White wax 5, white petrolatum 95.

Petrolatum Ceratum flavum.—Yellow wax 5, petrolatum 95. In either case the wax and the petrolatum are to be melted and subsequently stirred until cold. (*Phar. Weekbld.* through *Apothek. Zeitg.*, 1905, page 516.)

RECENT LITERATURE RELATING TO PHARMACY.

SOME NEW ESSENTIAL OILS.

Messrs. Schimmel & Co., in their semi-annual report for April-May, 1905, pp. 82–86, give the result of their examinations of the following oil:

Oil of *Tetranthera polyantha var. citrata* Nees. Of this tree, belonging to the Lauraceæ, which is distributed in tropical Asia, and is known in Java by the name "Ki-lemolo," bark and leaves were sent to us, which we submitted separately to distillation. The oils hereby obtained had a pleasant aroma, and were constituted as follows:

Oil from the bark[1] (yield of oil 81 per cent.). The lemon-yellow oil has a specific gravity of 0·8904, and a rotation α_D, of $+ 10° 11'$; it dissolves in about 1 and more volumes 80 per cent. alcohol. A test showed the oil contains aldehydes, probably a mixture of citral and citronellal (melting point of the napthocinchoninic acid 220° to 225°).

Oil from the leaves (yield of oil 5·42 per cent.): bright-yellow; $d_{15°}$ 0·9042; $\alpha_D - 15° 41'$; soluble in 2·5 to 3 and more volumes 70 per cent. alcohol. Contrary to the bark oil, the leaf oil appears to contain only citral (melting point of the naphthocinchoninic acid 198° to 200°), whose quantity amounts to about 30 per cent.; in the non-aldehydic portions cineol was detected (melting point of the iodol-compound 111°).

CORRESPONDENCE.

THE U. S. PHARMACOPŒIA.

How the Pharmacopœia is Published.—Prior to the 1890 edition the Committee on Revision of the U.S.P. sought a publisher as would an individual author of a new book. The convention of 1890 made a new departure, and instructed the Committee on Revision to secure the copyright for the revised Pharmacopœia. A contract was made with one firm to print the book, and with another to act as selling agent. The Committee on Revision realized a good profit, which was used in covering the expenses of the work of revision and paying the members a small honorarium. The convention of 1900 inaugurated a new plan by adopting a constitution and by-laws and taking steps which resulted in securing papers of incorporation for the United States Pharmacopœial Convention. The constitution provides for a Board of Trustees of five (with the president of the convention and chairman of the Committee on Revision as *ex-officio* members) in addition to the usual Committee on Revision. To the Board of Trustees is entrusted the transaction of all business, including the publication of the manuscript prepared by the Committee on Revision. The work has now reached that point where some idea can be given of the magnitude of the undertaking.

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[1] On the oil distilled from the fruit of *Tetranthera citrata* Nees, comp. Gildemeister and Hoffmann "The Volatile Oils," p. 405.

The printing began in June, 1904, and progressed steadily until June 17, 1905. At that time an imperfect sample copy was printed in order to obtain measurements for the size of cloth and leather sheets to be used in binding. The first complete unbound copy was furnished June 24th. Then followed cloth-bound copies. The first edition consisted of 10,000 copies. This was printed in two runs; the first of 2,000 copies, and the second, two weeks later, of 8,000 copies. This division of the edition was made in order that the chairman of the Committee on Revision could be notified of typographical and other errors discovered in the 2,000 copies, and have the corrections made in the plates before the 8,000 copies were printed. The chairman states that no serious errors were discovered, but, of course, it was desirable to correct typographical errors, even as small as the omission of a bracket or an apostrophe. The second edition of 5,000 was ordered bound July 21st. A third edition has been printed and will be bound as soon as the distributing agent can give an idea of the styles of binding desired.

Of course, corrections have been made in the plates for each edition as fast as errors were pointed out to the chairman of the committee. The different editions are designated by the serial letter on the printed coupon in the front of the book. "A" designates the first edition of 10,000, "B" the second edition of 5,000, "C" the third edition of 5,000. The fourth edition will bear the letter "D." It is estimated on good authority that at least 20,000 copies will be sold before January 1, 1906. The Board of Trustees will use the profit on these volumes in paying the expenses already incurred, and, as soon as possible, send the members of the Committee on Revision checks for the honorarium voted by the Board of Trustees at the annual meeting in May and announced in the report of that meeting.

Errors in the Pharmacopœia should be reported without delay to Prof. Joseph P. Remington, 1832 Pine Street, Philadelphia, Pa., so that corrections can be made in the plates before another edition is printed. Criticisms and suggestions for the next revision should also be mailed direct to Professor Remington. Requests for permission to use portions of the text of the Pharmacopœia in commentaries, works of reference, text-books and other similar publications should be made direct to the chairman of the Board of Trustees, Charles E. Dohme, Baltimore, Md.

Neither the Board of Trustees, nor the Committee on Revision members have anything to do in their official capacity with the National Formulary. This work is published and revised by the American Pharmaceutical Association, of which Charles Caspari, Jr., Department of Pharmacy, University of Maryland, Baltimore, Md., is the General Secretary.

The convention to arrange for the ninth decennial revision of the Pharmacopœia will be called by the president, Dr. Horatio C. Wood, for May, 1910. HENRY M. WHELPLEY, *Secretary*,

United States Pharmacopœial Convention.

August 12, 1905.

THE AMERICAN CONFERENCE OF PHARMACEUTICAL FACULTIES.

The American Conference of Pharmaceutical Faculties will hold its sixth annual meeting at Islesworth Hotel, Boardwalk and Virginia Avenue, Atlantic City, N. J., September 5th, at 3 P.M. Visitors are welcome at the meetings with the exception of executive sessions, which are held during the consideration and election of applicants for membership.

Each college is entitled to but one vote in the conference, but there is no limit to the number of delegates which a college can appoint. Credentials should be mailed at once to the secretary, Prof. J. O. Schlotterbeck, Ann Arbor, Mich. The following is the programme as far as arranged. Delegates are especially requested to come prepared to discuss item No. 8.

(1) The President's Address and such discussion as it may cause.

(2) Report of the committee on Dr. McGill's paper ("What Degrees should be Conferred by Colleges of Pharmacy?").

(3) Report of the Executive Committee on an article providing for the withdrawal or expulsion of members.

(4) Proposition to strike out Article 3 of the conditions under the heading "Applications for Membership."

(5) Consideration of minor changes in by-laws.

(6) Vote on application for membership.

(7) Presentation of volunteer papers.

(8) Discussion on the subject, "What the Conference Can and Should Do." HENRY M. WHELPLEY,

Chairman, Executive Committee,

St. Louis, Mo.

August 12, 1905.

QUALIFICATIONS FOR ADMISSION TO AND MEMBERSHIP IN THE AMERICAN CONFERENCE OF PHARMACEUTICAL FACULTIES.[1]

At the meeting of the American Conference of Pharmaceutical Faculties, held on Thursday evening, September 8, 1904, the report of the Executive Committee contained a series of articles defining the qualifications for membership in the Conference. Each article was considered separately and all were subject to considerable discussion, the purport of which was to so word each article as to make the qualifications definite and acceptable to all. Each article was finally adopted without dissent. The articles in detail are as follows:

(1) The institution shall be incorporated as a college or school of pharmacy, or be a department of a regularly-incorporated educational institution, or a department of a State university, or conducted by an incorporated pharmaceutical society.

(2) The school or college shall have been in continuous operation in America for at least five years prior to the date of application for membership in the conference.

(3) The institution shall include in its courses of instruction oral lectures, personal laboratory work, recitations and reviews. This shall exclude work in absentia.

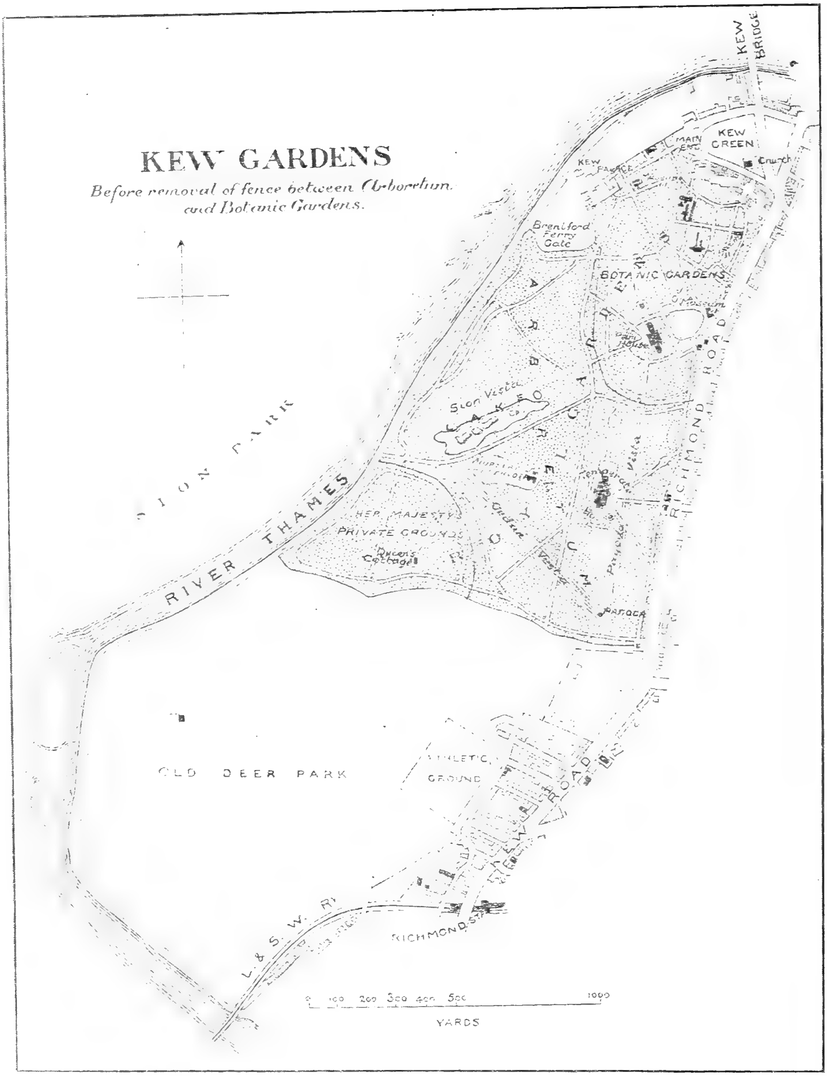
(4) The institution shall require of each candidate for graduation not less than 500 hours given to lectures and recitations, and not less that 600 hours of laboratory work, such work to be given in a period of not less that forty weeks.

(5) The requirements for admission of students to the school or college shall be (1) a minimum age of seventeen years, unless the candidate is a high-school graduate or possesses an equivalent education.

(6) If the information furnished by the applicant be regarded as sufficient to warrant, the chairman of the executive committee shall appoint a Committee of Visitation, consisting of three representatives of the conference, who shall visit such institution, shall inspect the equipment and method of instruction, and report their findings to the chairman of the Executive Committee.

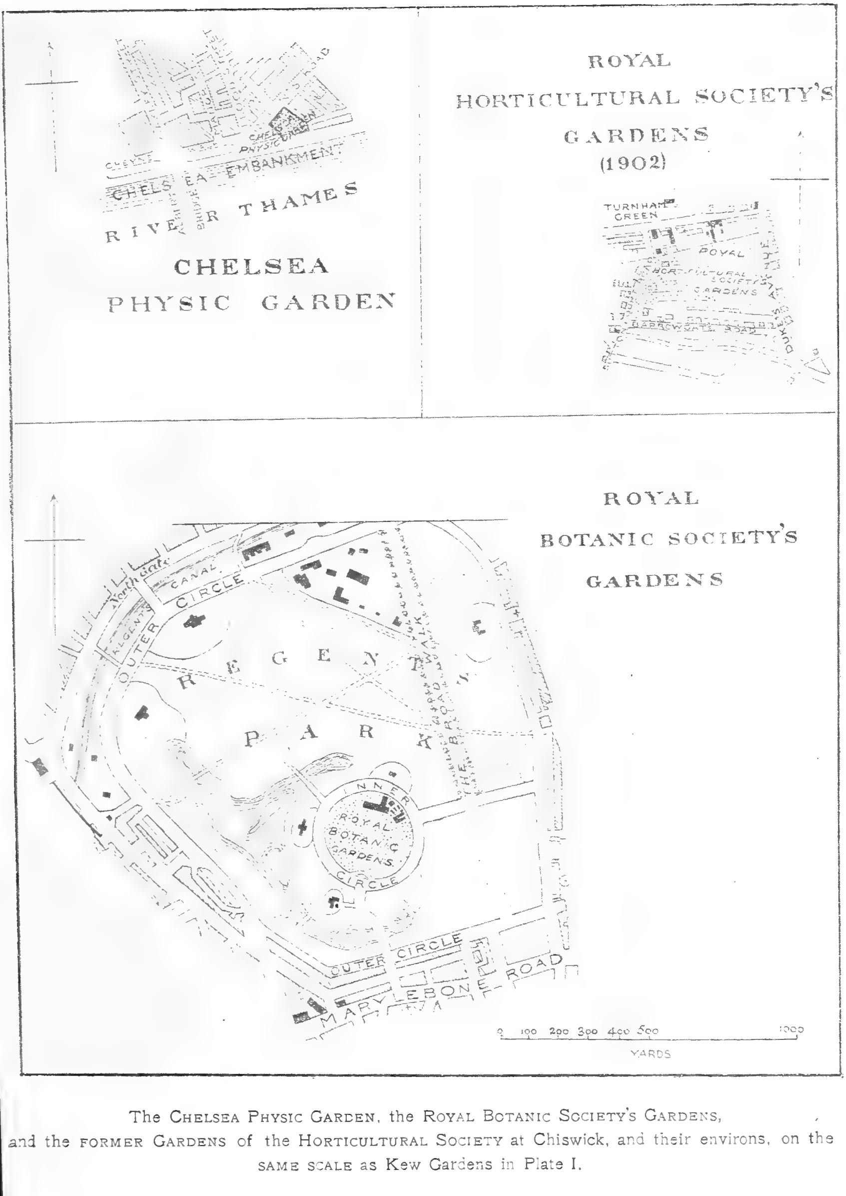
WILBUR L. SCOVILLE,
Secretary.

[1] Abstract of Minutes.



PLAN OF KEW GARDENS AND IMMEDIATE SURROUNDINGS, IN 1895.

NOTE.—*The dotted area represents the gardens themselves.*



The Chelsea Physic Garden, the Royal Botanic Society's Gardens, and the former Gardens of the Horticultural Society at Chiswick, and their environs, on the same scale as Kew Gardens in Plate I.

Note.—*The dotted areas represent the gardens themselves.*

Herbaceous Ground, Kew.

The plants are set out in parallel beds and arranged in regular sequence of natural orders.

THE AMERICAN JOURNAL OF PHARMACY

OCTOBER, 1905.

LONDON BOTANIC GARDENS.

BY PIERRE ÉLIE FÉLIX PERRÉDÈS, B.SC., F.L.S., Pharmaceutical Chemist.

A Contribution from the Wellcome Research Laboratories, London.

I.

INTRODUCTORY.

The origin of our Botanic Gardens may be traced to the private gardens of the herbalists of the sixteenth and seventeenth centuries. Among these the garden of John Gerarde, in Holborn, which was situated within little more than a stone's throw from the site upon which the Wellcome Chemical Research Laboratories now stand, may be cited as a noteworthy example. One of the main objects of these early cultivators was the determination of the characteristic features of plants used as remedial agents, and the framing of descriptions that would enable others to recognize such plants. It is not too much to say that many of their observations (*e. g.* those of Parkinson) are remarkably shrewd and accurate.

The Chelsea Physic Garden, established by the Society of Apothecaries of London, in 1673, was, to a great extent, based on the same plan as the gardens of these herbalists; but, unlike them, it was supported by a public body, so that it has survived to the present day. It was the first public institution of the kind in London, and it still remains as the oldest Botanic Garden in the metropolis.

Kew comes next in point of age, and its history as a scientific institution may be said to date from 1759, when William Aiton, a pupil of Philip Miller, of the Chelsea Garden, was appointed by the Princess Augusta of Saxe-Gotha, Dowager Princess of Wales, for the purpose of establishing a physic garden in what had hitherto

been little more than the ornamental grounds of her residence. Kew is, therefore, in a measure, an offshoot of the Chelsea Physic Garden.

The last Botanic Gardens which remain to be considered in detail are those of the Royal Botanic Society, in Regent's Park. These were begun in 1839 by that Society, with the ultimate object of forming "extensive botanical and ornamental gardens within the immediate vicinity of the metropolis," the purpose by which the Society was animated in so doing being the "promotion of Botany in all its branches, and its application to medicine, arts and manufactures."

Besides these, which constitute the only public *Botanic* gardens in London or its environs, mention must also be made of the Gardens of the Royal Horticultural Society, formerly at Chiswick, and now at Wisley, in Surrey. The Horticultural Society has, throughout, excluded the cultivation of medicinal plants from its field of operations, and this is a distinction which holds good, broadly, between "Horticultural" and "Botanic" gardens in this country. In view, however, of the importance of the Horticultural Society's Gardens from the cultural point of view, a short account of them will be given at the end of this introduction.

Before proceeding with the individual accounts of these gardens, it will not be without interest to pass briefly in review the salient features which they have in common, as well as those in which they differ from one another.

The arrangement of the plants in the gardens may conveniently be considered first, and affords much that is of interest. The Chelsea Garden, as we have just seen, was framed, in the main, on the pattern of the herbalists' gardens; to this we may add that one of the principal aims of its founders was the arrangement of plants in a systematic manner. At the close of the seventeenth century the plants were arranged according to the systems of Ray and Tournefort, and, in practice, this scheme is still partly adhered to, as a matter of convenience, in most Botanic Gardens, inasmuch as trees and shrubs are generally grouped apart from herbaceous plants. Towards the end of the eighteenth century we find the Linnean classification supplanting the systems of Ray and Tournefort, to be superseded, in turn, by those of Decandolle and Lindley towards the middle of the last century. Since the re-organization of the Garden in 1902,

Plate IV.

Herbaceous Ground. Royal Botanic Society's Gardens. Regent's Park.
The beds are of various shapes and sizes, and each one accommodates plants belonging to one natural order only. The beds are grouped around each other according to the affinities of the natural orders which they represent.

the sequence of natural orders which has been followed, for the herbaceous plants that are arranged systematically, is that of Bentham and Hooker's "*Genera Plantarum.*"

At Kew the arrangement adopted by Aiton was that of Linné, to be succeeded, as at Chelsea, by that of Decandolle, and, subsequently, during Sir J. D. Hooker's directorate, by that of Bentham and Hooker. It must be borne in mind that these changes could only be effectually accomplished with herbaceous plants, and that matters are complicated at Kew by the fact that, in addition to the plants which are arranged systematically, there are many others scattered about for artistic effect. In the present Arboretum, commenced in 1845 by Sir William Hooker, and remodelled by his son, an arrangement in regular sequence of natural orders, such as that adopted for herbaceous plants, is not possible, but the *Coniferæ* are grouped together to form a Pinetum, and most of the *Amentiferæ* are also in close proximity to each other. In the collection of shrubs, or Fruticetum, the genera of the same natural order are, as a rule, grouped together. Beyond this, little attempt is made at systematic arrangement. In the possession of an extensive Arboretum, arranged systematically, so far as possible, Kew differs from the other two Botanic Gardens in London.

The herbaceous collection at the Regent's Park Gardens was arranged according to natural orders from the first, and this system has subsisted to the present time, with slight modifications. The plants, instead of being set out in parallel beds and arranged in regular sequence, as at Kew and Chelsea, are disposed in beds of various shapes and sizes; each bed accommodates one natural order, and these are grouped around one another according to their affinities.

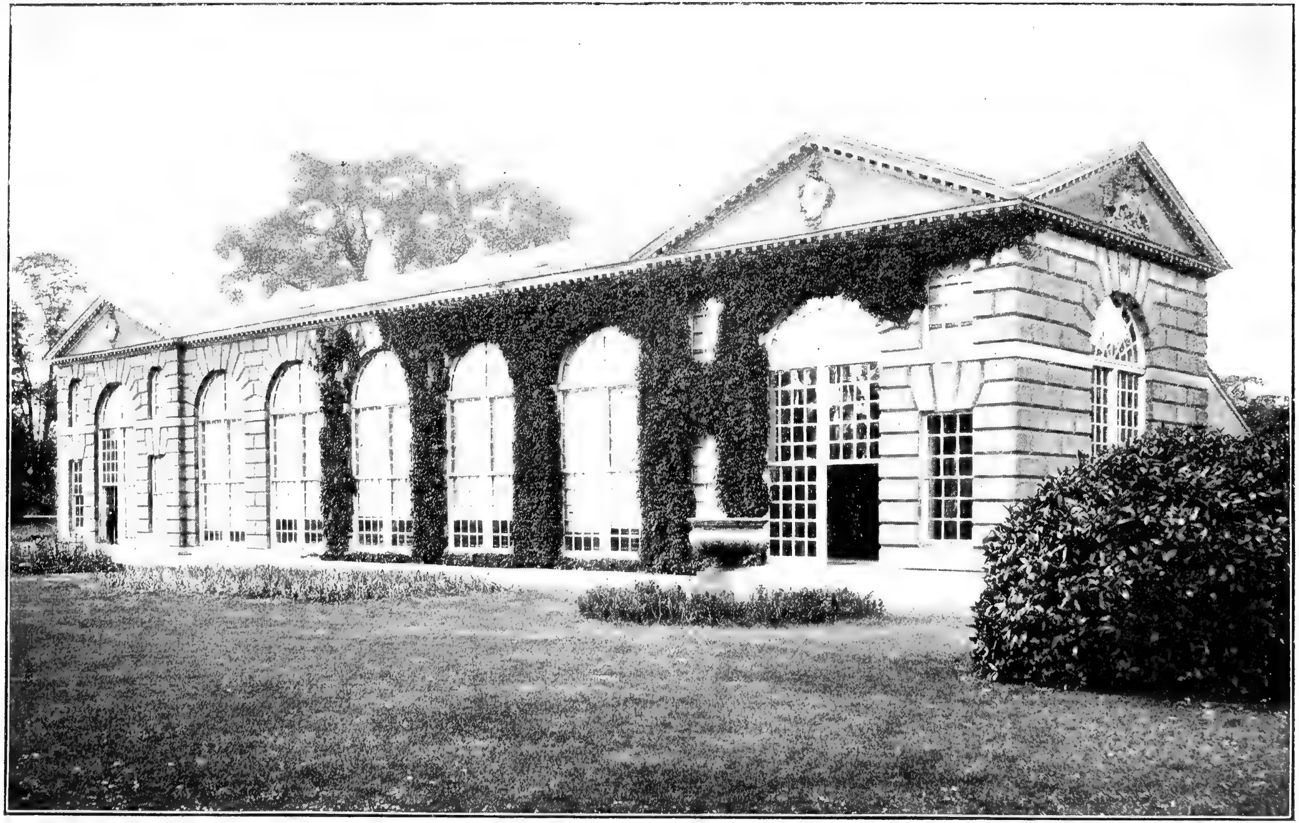
When the gardens at Chelsea and Kew were started, medicinal plants were the predominant feature, and subsequently, special collections of medicinal plants were formed in both of them. A section for economic plants was also set aside at Regent's Park, but, with the exception of a small garden of hardy herbaceous medicinal plants at Kew, and of a belt of shrubs and trees formerly surrounding the herbaceous ground of the economic collection at Regent's Park, these have now been merged into the general herbaceous collections; and even in the case of Kew, by far the larger number of medicinal plants are to be found in the general collection.

In addition to the collections already enumerated, it is to be noted

that alpine and aquatic plants require especial conditions for their successful cultivation, and such conditions are accordingly provided in the shape of rock gardens, water tanks, etc. As these plants, however, play an unimportant part in medicine, we may pass them over.

We have, so far, only considered plants growing out of doors, but a large number of medicinal plants from foreign lands would perish under ordinary conditions in this climate, so that some means had to be found by which the conditions of their habitats could be reproduced artificially, and this was attained by placing them in plant-houses, heated if necessary. The name of "stoves" was given to houses in which artificial heat was employed, as stoves were used for producing the necessary temperature, while those which were not heated artificially were known as "greenhouses;" and these names have survived to the present day. These houses were originally buildings with large windows, and there is an example of them on an elaborate scale in the orangery at Kew (now Museum No. III), built in 1761 (see Plate V). A stove was erected in the Chelsea Physic Garden as early as 1681. We learn from Evelyn's "Diary" that its author went to see the keeper of the "Apothecaries' garden of simples at Chelsea" on August 7, 1865, and the following remarks which he makes in this connection give us an idea of the method of heating adopted: "What was very ingenious was the subterraneous heat conveyed by a stove under the conservatory, all vaulted with brick, so as he has the doores and windowes open in the hardest frosts, secluding only the snow;" it is also interesting to record that "the tree bearing jesuit's bark (*Cinchona*), which had done such wonders in quartan agues" was then growing in the collection at Chelsea. In 1760 we hear of the construction at Kew of a stove warmed by pipes containing hot air. The method of heating by hot *water* pipes appears to have been introduced by the Horticultural Society in their garden at Chiswick. Experiments were made with these as early as 1822, but it was not until 1838 that they were brought to a satisfactory conclusion. The system of heating by hot water has now superseded all others.

Improvements in methods of heating were accompanied by advances in other directions, one of the chief of these being the use of iron for the framework of glass houses. The conservatory in the Regent's Park Gardens, erected in 1845, was the first iron and glass



PLANT HOUSE, OLD STYLE—THE ORANGERY (NOW MUSEUM III) AT KEW.

house of considerable size in England, and was soon followed by the far-famed Palm House at Kew (Plate VI). The framework of the smaller houses is usually of wood, as the additional strength which has been obtained by the use of iron in larger structures is not needed for buildings of smaller dimensions.

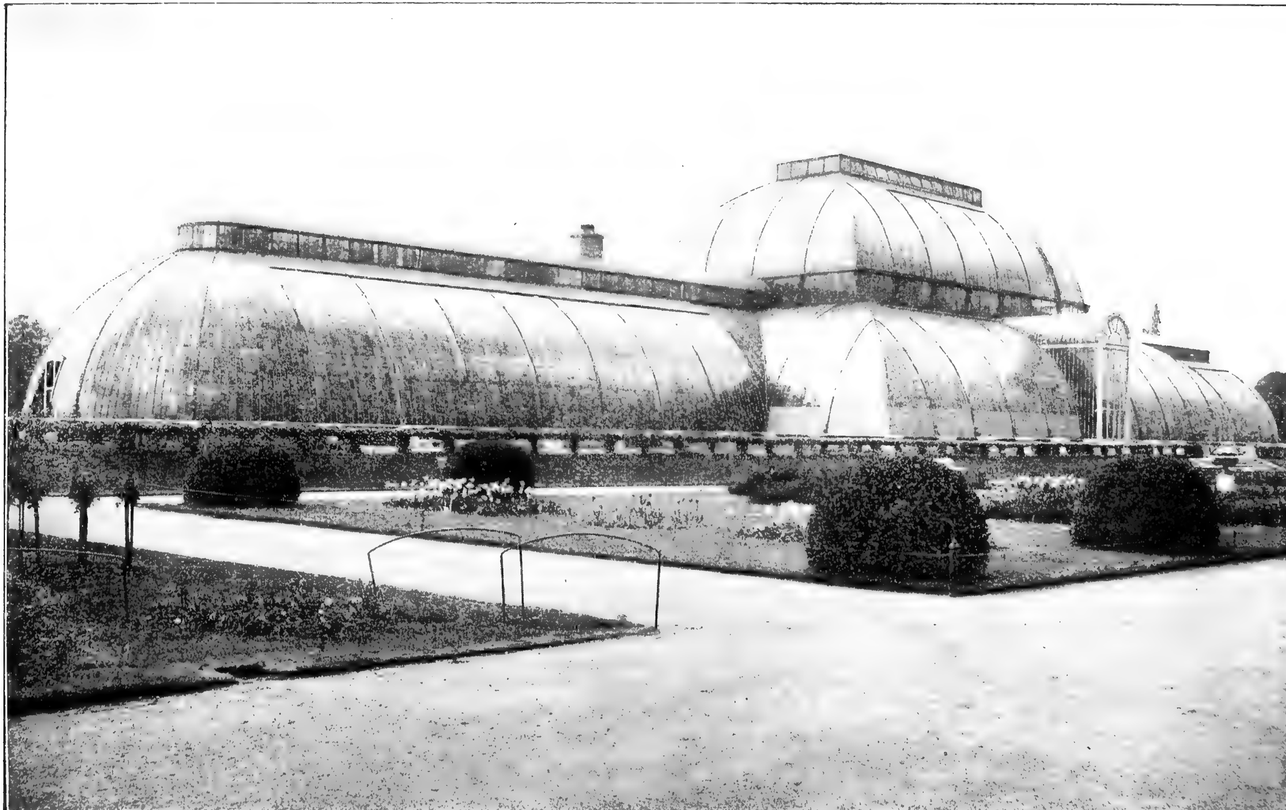
In each of the London gardens there is at least one range of plant houses, a "range" consisting of a series of glass houses in which the temperatures *range* from 65° to 75° F. in the tropical house or stove, to 45° to 50° F. in the cool house or greenhouse. At Regent's Park there is a range of three houses for economic plants solely, heated respectively to 65° to 70° F. (stove), 60° to 65° F. (intermediate house), and 45° to 50° F. (greenhouse). At Kew two houses of a range, one tropical, the other temperate, are devoted to economic plants, while at Chelsea the range of three houses, backed by a corridor, is used for the majority of the plants that require to be grown indoors. In addition to these there are larger houses at Kew for the accommodation of general collections of plants from tropical and sub-tropical countries and from the antipodes, such as the Palm House ("stove" heat) and the temperate house, which consists in principle of a range of houses. The conservatory at the Regent's Park Gardens corresponds, in part, to the temperate house at Kew, while one of the wings is partitioned off as a small "Palm House." Houses for plants requiring special conditions are also provided, but the only ones that need be referred to here are those in which succulent plants, such as the various species of *Aloe*, are grown. Plants from arid regions, such as these, require a dry atmosphere, and special houses are accordingly provided for them at Kew and Regent's Park. Most of the succulents at the Chelsea Physic Garden are grown in one of the pits.

Owing to exigencies of space, very little systematic arrangement is attempted in the case of plants grown under glass, the nearest approach to this being in the Palm House at Kew, where the smaller plants on the benches around the sides are grouped geographically. The method of arranging the plants most commonly adopted is such that the larger plants are placed in the center, in a span-roofed house (see Plate XII), or, if in a lean-to house, near the wall, while smaller specimens are grown in pots on benches around the sides.

Turning now to the functions by which the gardens are charac-

terized, we find that Chelsea and Regent's Park have, in the main, played an educational rôle, whereas Kew stands out prominently as a center of scientific research and as the cradle of botanical enterprise in India and the Colonies. The history of the development of the respective gardens is of paramount importance in this connection, and a brief outline of this will, accordingly, be given.

The main considerations which led the members of the Society of Apothecaries to establish a garden at Chelsea, for the cultivation and systematic arrangement of indigenous and exotic plants, were that "their apprentices and others" might "better distinguish good and useful plants from those that bear resemblance to them, and yet are hurtful, and other the like good purposes." The garden, it is true, was, to some extent, utilized at first for the cultivation of plants to be converted into drugs for the Society's use, but this practice was soon abandoned. At a relatively early period in the history of the Society a "Demonstrator of Plants" was appointed in connection with the garden; James Petiver, F.R.S., officiated in this capacity as early as 1709, but it was not until 1724 that the Demonstrator of Plants, then Isaac Rand, was appointed to the superintendence of the garden, with the title of *Præfectus Horti*, or Director of the Garden. The duties of the office of Demonstrator of Plants and *Præfectus Horti* were defined in detail by a garden committee, on the appointment of William Curtis to the post in 1773. The enumeration of these duties is of special interest, in that it gives us an insight into the nature of the work that the Society was doing at that time, in connection with its garden. That this was chiefly educational in character will be gathered from the provisions in question, which were, briefly, as follows: (1) The Society's Demonstrator of Plants and *Præfectus Horti* was to superintend the garden and library, and to encourage and cultivate the knowledge of botany among students of the Society; (2) "to demonstrate the plants, especially in the officinal quarter, with their names and uses," at least once a month, from April to September; (3) "to make some annual excursion, for two days at least," in the company of "two or three" competent "botanical members," for the purpose of collecting plants not commonly found near the metropolis, preparatory to a demonstration of the same at the Society's "General Herborizing"; (4) to "accompany and conduct the students of the Society in their search after indigenous plants" upon every day ap-



Plant House, new style—The Palm House, Kew.

pointed for the purpose; (5) to prepare annually a specified number of herbarium specimens; (6) "to attend each private court at the hall during the summer months," in order to give advice on matters relative to "the private herborizings" and to the management of the garden; he was also recommended to cultivate "extensive botanical correspondence, both at home and abroad."

The reputation of the garden as a center for the diffusion of knowledge was, moreover, much augmented between 1722 and 1770 by the exertions of Philip Miller, who was appointed gardener in 1722, and who published in 1730 the first catalogue of the officinal plants growing in the Chelsea Garden. This will be considered in greater detail later, but it is of interest to note that, although the book is written in Latin, every plant mentioned has an English name appended to it, a feature which must have considerably enhanced its value to the learner. Two other works of which Philip Miller was the author, viz., the "Gardener's Dictionary" and "A Short Introduction to the Science of Botany," added in no small degree to the reputation of the Chelsea Garden as an educational center, but the most far-reaching result of Philip Miller's labors is probably to be found in the fame achieved by his pupils, such as Aiton at Kew, and his own successor at Chelsea, William Forsyth.

In 1829 an extension of the Society's work was inaugurated, consequent upon a resolution of the Garden Committee to the effect that the garden should be made "more useful to the profession at large than it had hitherto been," and medical students from the recognized metropolitan schools were admitted, free, to the garden once a week, on the recommendation of their respective teachers. The result was so successful that in the following year the Society's demonstrator was appointed professor at an increased salary, and lectures were delivered by him once a week to all accredited medical students who chose to take advantage of them. Two medals presented by the Society were also offered for competition annually. A large number of students availed themselves of the privilege granted to them by the Society, and in the same year "by far the best catalogue of the medicinal plants in the Chelsea Garden ever published" was issued by the professor, J. L. Wheeler. This work was at the same time a guide to medical botany, and, although the classification adopted was that of Linné, it is of the greatest interest

to note that a synopsis according to the system of Jussieu was also added.

This important phase of the Society's work was continued until 1853, and, between the years 1836–1853 the fame of the Chelsea Garden was at its zenith, largely owing to the disinterestedness and boundless activity of that great man, John Lindley, who occupied the post of Professor of Botany and *Præfectus Horti* during that period. In 1853, the Society, hampered financially by the expenses involved in this work, decided to relieve the strain by working their garden more economically in the future. The lectures in the garden were discontinued, the office of *Præfectus Horti* was abolished, and the cultivation of plants requiring artificial heat was abandoned. The annual prizes were, nevertheless, still awarded, and, in 1863, chiefly through the efforts of one of the Society's members, Nathaniel Bagshaw Ward, the inventor of the "Wardian Case," an attempt was made to restore the garden to a semblance of its former standing. The garden still continued to attract a number of medical students, but these were gradually drawn to the more easily accessible Regent's Park Gardens. In 1878 a prize competition, open to women only, was instituted by the Society with the object of encouraging the study of botany among women students. Notwithstanding these spasmodic attempts to infuse new life into the work of the garden, its importance gradually decreased until it sank into insignificance; it was saved from oblivion during this period, however, by its curator, Thomas Moore, who had been elected to the post in 1848 on the recommendation of Lindley. Thomas Moore was co-editor of the "Treasury of Botany" with Lindley, and it is chiefly to his labors that we are indebted for that invaluable dictionary of the vegetable kingdom; a work which has probably contributed, in a greater degree than anything else, to make the name of the Chelsea Garden known throughout the world. In 1899 the Trustees of the London Parochial Charities were appointed trustees of the garden, and a committee of management, to be described later, was appointed; new plant houses, a lecture-room and laboratory, etc., were erected, and, in 1902, the garden was formally re-opened. The rôle of the garden is still mainly an educational one; specimens of living plants are supplied to a number of colleges and schools, the laboratory is used for physiological work by the students of the Royal College of Science, and advanced courses of

Laboratory, Lecture Hall, and Curator's Residence, Chelsea Physic Garden.

university lectures are delivered in the lecture-hall. Since its reorganization, however, the garden has also been used for purposes of research, notably by Mr. Francis Darwin and by Sir William Ramsay.

The Royal Botanic Society's Gardens in Regent's Park have had but a short history, and, after what has been said in connection with the Chelsea Garden, it can be summarized in a few lines. The cultivation of medicinal and other economic plants has always been fostered by the Royal Botanic Society, and, in consequence of this, teachers in the medical schools soon found it advantageous to make use of its gardens for the instruction of their pupils; for many years the late Professor Bentley delivered lectures in the gardens at 7.30 o'clock on certain mornings to the students of the Pharmaceutical Society's School. The distribution of cut specimens of plants to medical schools and other educational institutions (sometimes to the extent of 60,000 specimens per annum) was an innovation which helped to extend the sphere of usefulness of the Regent's Park Gardens, and these still remain the principal source of supply for fresh botanical specimens to the majority of the medical schools in London. One of the earliest features introduced by the Society into its gardens was an exhibition ground where exhibitions of plants and flowers were held periodically; of later years some of these displays have been developed into very instructive exhibits of botanical work done in schools. The museum, erected in 1851, was originally furnished with specimens for educational purposes solely; the collections have since been considerably extended, more especially by the addition of economic products derived from the vegetable kingdom, but the educational element still preponderates in the collections, which are hardly of sufficient extent to be used for purposes of reference as at Kew. In 1897 a practical gardening school was established by the Society. In connection with this, a portion of the gardens has been specially set aside for horticultural work, and a laboratory, which is also used as a lecture-room, has been erected. The Royal Botanic Society's Gardens are also utilized as a pleasure-ground by its Fellows and others, but the consideration of this factor hardly comes within our province.

[*To be continued.*]

HELEN ABBOTT MICHAEL.

By Samuel P. Sadtler.

The subject of this sketch, a former special chemical student of the Philadelphia College of Pharmacy, and at the time of her death an honorary member of the College, as well as a member of several learned societies, affords a striking example of a life devoted to ennobling literary and scientific pursuits.

Helen C. De Silver Abbott, daughter of James Abbott and Caroline Montelius, was born December 23, 1857, in Philadelphia, Pa. Educated under the care of private teachers, she showed special aptitude for music, which she studied both at home and abroad. She was not only a brilliant performer on the piano, but made a thorough study of the principles of music, and might have made her mark, not only as a public performer, but as a composer.

In the early eighties she began to be interested in scientific subjects, and in June, 1882, entered the Woman's Medical College of Pennsylvania and attended lectures for two sessions, but did not graduate. Being attracted towards the study of chemistry, she acted as assistant in the Chemical Laboratory of the Philadelphia Polyclinic School for a time, and early in the summer of 1884 she came to the writer to arrange for facilities for carrying out work on plant chemistry. This led to her beginning work at the Philadelphia College of Pharmacy Laboratory, where she worked with some interruptions until 1887, when she went to Germany to pursue her studies.

The years spent in the Philadelphia College of Pharmacy Laboratory were very fruitful in valuable results in plant chemistry, as will be seen from the appended list of published papers during this period. She had special facilities provided by the Board of Trustees of the College in a small research laboratory adjoining the main Chemical Laboratory, and she gathered for herself through private sources abundant supplies of some Mexican and Central American plants that had never before been investigated. But she had also the constant advice and direction in the work of an accomplished botanist and chemist, the late Prof. Henry Trimble.

These papers on plant analysis and chemistry were also of great theoretical interest, abounding, as they did, in most suggestive thought. Dr. H. W. Wiley, of the Department of Agriculture, has said with regard to them that "her studies in tracing the relations existing between chemical composition and botanical species are of the highest interest from the viewpoint of research."

HELEN ABBOTT MICHAEL,
1857-1904.

In 1887 she received the distinction of election to membership in the American Philosophical Society.

She went abroad this year with the intention of pursuing the study of organic chemistry at Berlin, but was advised that the most advanced student in synthetic organic chemistry, as applied to plant substances, was Prof. Arthur Michael, of Tufts College, Mass., who had in 1879 effected the first synthesis of the natural glucosides helicin and salicin. She therefore returned to this country and worked for a time in the laboratory of the Massachusetts Institute of Technology, in Boston, under Professor Michael.

She was married to Professor Michael in Philadelphia in the summer of 1888, and again went abroad with him. After a two years' trip around the world they settled for a time in the Isle of Wight, where, in a private laboratory, with several assistants, they both resumed chemical work. Mrs. Michael's work done during this period was mostly published in German chemical journals.

Professor Michael returned to this country to take the chair of chemistry in the newly-founded Clark University, at Worcester, Mass., and later removed to Boston and resumed his connection with Tufts College.

Mrs. Michael, becoming interested in sociological work in Boston, determined to again take up the study of medicine, and graduated in June, 1903, from Tufts College Medical School with a most brilliant record. She turned her home on West Cedar Street into a free hospital, and soon found the fullest scope for her attainments and skill as well as for her philanthropic sympathies. This work was done without giving up her interest in art and literature, as is shown by her connection with different literary undertakings in Boston. After a severe attack of the grip in the spring of 1904 her health began to fail and she finally succumbed to heart failure, passing away November 29, 1904.

Mrs. Michael was a Fellow of the American Association for the Advancement of Science, a member of the American Philosophical Society, a member of the German Chemical Society of Berlin, an honorary member of the Philadelphia College of Pharmacy, a member of the Academy of Natural Sciences and of the Franklin Institute of Philadelphia.

The list of her published papers, here appended, while not complete, covers her contributions to chemical literature.

1883. Paper on "Nutritive Value of Condiments." Published in 1883.

1884. "Preliminary Analysis of the Bark of Fonquieria Splendens." Read before Am. Phil. Soc., Nov. 7, 1884.

1885. "Yucca Augustifolia, a Chemical Study." Read before Am. Phil. Soc., Dec. 18, 1885.

1886. "On Hæmatoxylin in the Bark of Saraca Indica." From Proceedings of Acad. Nat. Sci., Philadelphia, Nov. 30, 1886.

"Certain Chemical Constituents of Plants Considered in Relation to Their Morphology and Evolution." Abstract of paper read before Buffalo meeting of A. A. A. S., 1886.

"Preliminary Analysis of a Honduras Plant called 'Chichipati.'" Also read before the Buffalo meeting of the A. A. A. S., 1886.

Paper on "Phlox Carolina." Read before Am. Phar. Assoc., at Providence, R. I., Sept., 1886.

1887. "Plant Analysis as an Applied Science." Lecture before Franklin Institute, Jan. 17, 1887.

"Plant Chemistry as Illustrated in the Evolution of Sugar from Sorghum." Delivered before the Alumni Association of the Philadelphia College of Pharmacy, Feb. 8, 1887.

"Comparative Chemistry of Higher and Lower Plants." Extracted from *American Naturalist*, Aug. and Sept., 1887.

"The Chemical Basis of Plant Forms." Reprinted from *Journal of the Franklin Institute*, Sept., 1887.

1888. "On the Occurrence of Solid Hydrocarbons in Plants." AM. JOUR. PHAR., July, 1888, jointly with Henry Trimble.

1892. "Ueber eine neue Bildungsweise von aromatischen Nitriten." By H. A. M. and John Jeanprêtre. Berlin. Berichte, No. 237.

"Zur Kenntniss der Mandelsäure und ihres Nitrits." By H. A. M. and John Jeanprêtre. Berlin. Berichte, No. 248.

"Zur Kenntniss der Addition von Brom und Chlor zur festen Crotonsäure." By Helen Abbott Michael.

(Separat Abdruck aus dem Journal für praktische Chemie, neue Folge, Band 46; Leipzig, 1892.)

1894. "Zur Constitution des Phloretins." By Helen Abbott Michael. Berlin. Berichte, No. 488.

1896. "A Review of Recent Synthetic Work in the Class of Carbohydrates." By H. Abbott Michael. Reprinted from the *Journal of the Franklin Institute*, Sept., 1896.

LITERARY PAPERS.

1886. "Science in Philosophy and Art." By "Celen Sabbrin." Wm. F. Fell & Co., Philadelphia, 1886.

1895. "The Drama in Relation to Truth." By Helen Abbott Michael. Read before the New England Women's Club, Dec. 10, 1894. Published in *Poet Lore*, March, 1895.

1897. "Woman and Freedom in Whitman." Read before the Walt Whitman Fellowship of Boston, Nov. 19, 1896. Published in *Poet Lore*, April and June, 1897.

A SIMPLE ARRANGEMENT FOR PERCOLATION WITH HOT ALCOHOL.[1]

BY H. M. GORDIN,
Northwestern University, School of Pharmacy.

Most hot extraction apparatus have the disadvantage of being costly and breakable and are generally suitable for small amounts of drug only.

By means of the following simple arrangement any reasonable amount of drug can be exhausted with hot alcohol in ordinary percolators.

The arrangement consists in rolling a coil of rubber tubing around the percolator and passing a stream of hot water through the tubing during the percolation.

The water can be heated in a separate vessel or obtained from any other source and the percolator kept well covered to prevent undue evaporation.

Such an arrangement requires, of course, a much larger amount of alcohol than a Soxhlet, for example, but as the alcohol can be recovered this is no particular disadvantage.

A COMBINATION PERCOLATOR AND SHAKING TUBE FOR THE ASSAY OF ALKALOIDAL DRUGS.[2]

BY H. M. GORDIN,
Northwestern University, School of Pharmacy.

For the assay of some alkaloidal drugs, for example, coca and belladonna, the U.S.P. of 1900 directs to shake the powdered drug in an Erlenmeyer flask with a mixture of ether, chloroform and ammonia for a certain length of time and then transfer the mixture of drug and powder to a small percolator in which the drug is exhausted by percolation with a mixture of ether and chloroform.

For the assay of some other drugs, for example, aconite, the pharmacopœia directs to use the same method, but substitutes another menstruum for the exhaustion of the drug.

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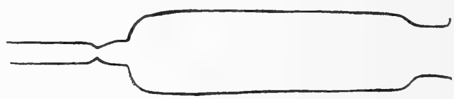
[1] Presented at the meeting of the American Pharmaceutical Association September, 1905.

[2] Presented at the meeting of the American Pharmaceutical Association September, 1905.

It is easy to see that there lurks a source of error in the operation of transferring the mixture of drug and menstruum from one vessel to another, particularly in the case of ethereal menstrua, which always have a great tendency to "creep" to the outer sides of the vessel.

In order to avoid the necessity of transferring the mixture of drug and menstruum from one vessel to another, I have devised a simple apparatus by means of which both the shaking and the percolation of the drug with the suitable menstruum is carried out in one and the same vessel.



The apparatus (see accompanying figure) consists of a cylindrical tube drawn out at both ends so that it has the shape of an ordinary percolator, but a neck like an ordinary bottle. The main body of the tube has an inner diameter of 25 millimeters and is 200 millimeters long. The lower, longer but narrower drawn-out part has an inner diameter of 14 millimeters and is 30 millimeters long. At the juncture of this narrow tube to the main body of the tube there are three rather deep indentations in the narrow tube.[1] The upper bottle neck-shaped end of the tube has an inner diameter of 17 millimeters and is 10 millimeters long. The whole apparatus is made of strong glass of about 1 millimeter wall thickness.

The tube is used in the following way: A piece of cotton is placed in a piece of cheese-cloth and then pushed up from below with the cloth upwards into the narrow tube so that the plug reaches the indentations and closes the tube rather tightly. The plug is then followed by more cotton so as to nearly fill the narrow tube and the latter is closed by a good perforated cork, through which passes a thin glass stop-cock.

In the case of ethereal menstrua which percolate easily, a small circular disc of filter paper can be placed on the top of the stop-cock. In this case the percolate will be perfectly clear.

After closing the stop-cock the weighed-out drug is introduced through the open end of the tube, and after adding the proper

[1] Of the three indentations only two are shown in the figure. The indentations on the outside are, of course, protuberances on the inside of the tube.

menstruum the apparatus is closed with a good cork. The tube can now be shaken any length of time without the plug becoming dislodged.

After shaking the tube the prescribed length of time it is set aside with the stop cock downwards till the drug has well settled and the percolation then finished as with an ordinary percolator.

The shaking of the tube should always be done in the plane of it, as violent side motions are liable to throw out the stopper of the stop-cock unless it be tied down.

Any maker of chemical glassware when given the description of this percolator tube can make it in a few minutes at a very insignificant cost and in any desirable size.

The dimensions here given are suitable for 10 grams of drugs.

THE MANUFACTURE OF PHARMACEUTICAL PREPARATIONS.[1]

By A. C. Zeig, Ph.C.

The preparing of medicaments for healing the sick and the wounded, no doubt antedates pharmacy as a profession by many centuries. Its evolution is the evolution of pharmacy itself through many centuries of struggle for recognition as a profession, the sole specialty of which was to be the preparing and dispensing of medicine in accordance with the will of the physician.

The adoption of pharmacopœias and standard formulæ centuries ago, no doubt, was a great aid to the apothecary of that time, and history records the fact that a pharmacopœia was adopted as the official standard as early as A.D. 1150, at Salerno, in the Kingdom of Naples, Italy, and was recognized as the official standard throughout Europe a long time after. Every apothecary was compelled, under oath, to manufacture all the medicaments according to the official pharmacopœia.

The first work corresponding to the modern idea of a pharmacopœia, which likewise received legal sanction in Europe, was the work of one Valerius Cordus, at Nuremberg, Germany, published about 1546. All druggists were directed to prepare their medicines according to the directions therein laid down.

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[1] Read at the Lewis and Clark Pharmaceutical Congress, Portland, Ore., July, 1905.

A work published in 1542 by Brother Bernardino Laredo, at the convent of Valverde near Seville, gives some insight into the nature of pharmaceutical preparations popular at that time. He describes the medicines in use at that period as laxatives, pills, powders, troches, narcotics, syrups, oils, decoctions, ointments, salves, plasters, confections and conserves.

With the appliances or apparatus limited and crude, it is remarkable to observe the list of products manufactured by the pharmacist at that period.

The theriaca of to-day is but one example of the forms of medication in use in Ancient Rome. The confection of opium, recognized in some of the European pharmacopœias, is simply a substitute for the exceedingly complex and unscientific electuary known as theriaca or mithridate, invented by Andromachus, the head physician of Nero, a position which, no doubt, demanded a great deal of skill and genius. This celebrated electuary has been handed down to us through eighteen centuries. Andromachus is said to have introduced it as an improvement on the, at that time, famous mithridate. While the composition of the two electuaries were about the same, theriaca contained vipers' flesh and other less active ingredients, principally aromatics, constituting in all about sixty in number. The active ingredient would appear to have been opium, about 1 per cent., but its popularity in those days of degenerate Rome was supposed to be as a preventive and antidote for poisoning. The fact of its containing a great many choice drugs made it impossible for it to be manufactured outside of the great trade centers of Italy. It was manufactured in Venice during the week of the great annual fair, the yearly gathering for business and pleasure.

During the first half of the last century, the pharmacist of this country manufactured all his galenicals, and purchased his mineral acids, also the organic acids such as tartaric, citric, oxalic and benzoic and the principal heavy chemicals in use at that time.

The introduction of a limited number of fluid extracts into the pharmacopœia of 1850 marks the beginning of a period notable in the history of pharmaceutical manufacture in this country, inasmuch as this class of preparations of American origin has become thoroughly popular and the number increased in subsequent revisions of the United States Pharmacopœia, so that it embraces eighty-eight official fluid extracts in the revision of 1890, besides those recog-

nized as semi-official in the National Formulary. In addition to these, there are prepared in every pharmaceutical laboratory about 300 unofficial fluids, which constitute part of the stock on hand. Large quantities of fluid extracts are annually manufactured in the United States. In considering, for example, cascara sagrada, whose habitat is on the coast, and for the supply of which we shall always have to depend upon the drug gathered in this and adjoining States, available data show that during the season of 1904 there were shipped from this coast to the different parts of the globe, about 1,500,000 pounds of cascara bark, the greater portion of which passed into the hands of manufacturers to be made into fluid extracts, such as the U.S.P., the bitterless and the aromatic.

Concerning the alkaloids, it may be said that the extraction of alkaloids was in its infancy at the middle of the century, for although quinine had been on the market several decades, its use was limited, owing to the high price it commanded. The same was true regarding morphine. Chloroform, ether, guncotton and collodion were in use before the Civil War, while subsequently glycerin came into use as a solvent in manufacturing pharmacy and made possible important advances in skin medication, resulting in the introduction of the official glycerites into the Pharmacopœia of 1870. Large quantities of glycerin are annually employed in the laboratory. Its use as an antiphlogistic in the form of a paste is of recent date and promises great possibilities.

The demand for medical supplies during the Civil War acted as a stimulus to pharmaceutic manufacture and resulted in the establishment of laboratories on a large scale. In consequence of the active demand for pharmaceutical products, chemists devised new methods for the extraction and purification of alkaloids, the manufacture of chloroform, ether, nitrous ether, as well as fluid and solid extracts, resulting in the cold-process extraction of drugs in use at the present day. A vast number of new materia medica products were exploited and it was the beginning of an era in pharmaceutic manufacture, which for its scope, the number and character of products manufactured, the mechanical devices and machinery employed, exceeds all efforts of preceding centuries.

The great activity in the field of manufacturing pharmacy no doubt to some degree justified the alarm felt by some of the retail pharmacists, who maintained that the manufacturers were encroach-

ing upon the field of the retailer and depriving him of part of his revenue, or such as was derived from manufacturing his own preparations, maintaining, of course, that every pharmacist should manufacture his pharmaceuticals as much as possible. While such a view of the matter would seem to be the correct one, and in harmony with the views held thirty or forty years ago, the conditions have changed, especially during the past thirty years. The addition of a vast number of products to the materia medica from vegetable, mineral, and animal sources, and the lack of machinery and necessary appliances, makes the manufacture of pharmaceutical preparations a problem far beyond the scope or capacity of a druggist's laboratory. Greater advances have been made in the last thirty years in the perfecting of labor-saving machinery in use in the large laboratories than have been made in all the preceding centuries.

As to important new features in machinery in the modern laboratory, I wish to call attention to the improved tablet machines, capable of compressing 200,000 tablets in ten hours; pill-cutting machines and vacuum gelatin-coating machines, which by means of vacuum tubes and two operators, are capable of coating 75,000 to 100,000 pills in a day, supplanting the old process of gelatin coating by means of the needle rack, which process left a needle-hole in the finished pill. The use of vacuum stills for concentrating extracts is an important feature in the modern laboratory and has been in use for some years; another important feature is the centrifugal extractor and the centrifugal filter, now being adopted in place of the unsightly filter presses and the filter stands of the past. Among other ingenious machines are the power suppository machine, collapsible-tube closing machine, mass mixers, granulators, pulverizers and other labor-saving devices which constitute the equipment of the modern manufacturing plant. Thus it is that by the use of labor-saving machinery of the present and the use of improved processes and skilled operators, the pharmaceutical laboratories to-day are enabled to manufacture products quicker, cheaper and better than was possible forty years ago, when such machinery was not in use. Instead of the manufacturers encroaching upon the field of the retail pharmacist, he is an aid to the retailer in the field of pharmacy, and their interests are mutual, so to speak, as producer and dispenser.

Laboratories are now established in nearly all the principal cities.

The building of railroads and rapid communication with the large cities enables the pharmacist of to-day to obtain his preparations quicker than he can prepare them himself, and at no greater cost.

Besides, the problem of assay and standardization subsequent to manufacture is to be dealt with, which in every well-regulated laboratory to-day is a department of itself, for the present condition of pharmaceutical science demands that products of greater exactness and uniformity be presented to the prescriber than was possible four decades ago. The advances made during that time enable the manufacturer to better control the problem in hand, which means by preliminary assay the securing of more reliable crude material than was before possible.

The tendency at the present time is altogether in favor of a form of medication which presents the medicament in the most compact, convenient, and at the same time stable form possible, namely, in the form of compressed tablets or tablet triturates. The value of this form of medication is open to some controversy. Convenient as they are, especially in first aid and in emergencies, they do not, in some instances, satisfy the criticism of the chemist or the exacting practitioner. Many of them have been called into existence by physicians desirous to please fastidious patients, and are not based upon good judgment or scientific principles. Often it would be wise to discourage rather than to popularize them. This refers especially to tablets containing organic ingredients of feeble chemical stability, or such as are prone to change by oxidation or absorption of moisture. They are porous bodies containing medicinal substances highly subdivided and in some instances desiccated, without a protecting coating, and therefore in a condition to be readily affected by those most potent factors—atmospheric oxygen and moisture. Such medications are unstable unless the ingredients are resistant, and many combinations should therefore be discarded, as, for example, nitroglycerin and digitalin, nitroglycerin, digitalin and heroin, nitroglycerin, strychnine and morphine, calcium sulphide and the alkaloids, phosphorus or zinc phosphide, single or in combination, etc.

The use of soluble elastic gelatin capsules for administering unpalatable medicaments has made it possible to administer oils, oleoresins and balsams, or a solution of unpalatable medicaments in oil. A great number of combinations or formulæ are now popular

and the use of elastic gelatin will no doubt always play an important part in medication of this character. Although described as early as 1857, the elastic capsule did not appear on the market until 1885.

The fact that the commercial salts of bismuth exist in the form of sharp, prismatic crystals, or in a coarse or dense physical condition, has induced a Western manufacturer to place these salts on the market in the form of a magma or milk of bismuth. As it is claimed that the action of bismuth salts is entirely mechanical, it is claimed for the amorphous bismuth magmas that owing to the extreme fineness of division, they are capable of covering or coating much more sensitive nerve surface than is possible by the use of the commercial salts, which on drying assume a crystalline, prismatic form or coalesce into granular masses.

Cresylic acid or cresol is taking the place of carbolic acid as an antiseptic and disinfectant. It is used in combination with soap and is said to be three times more powerful as a disinfectant and three times less caustic and poisonous than carbolic acid. Large quantities of the compound antiseptic are manufactured in the United States annually and employed in surgical work in 1 and 2 per cent. solutions.

The use of iron salts, organic and inorganic, will always play an important part in medicine. The popular dialyzed iron of two decades ago has been supplanted by the more popular organic combination or so-called "peptonate" of iron. Large quantities of the solution of iron peptonate and manganese are manufactured annually in the United States.

The use of glycerino phosphoric acid and the glycerino phosphates in modern medication is noteworthy, inasmuch as they may eventually take the place of the hypophosphites, so largely employed at present in the form of syrups. Owing to their being hygroscopic their use in tablets is not practicable, hence they are generally presented in solution in the form of elixirs.

The alchemist of old never realized that the yellow metal he sought to produce would be utilized many centuries after him in curing the liquor habit. At the present time gold chloride, gold and sodium chloride and gold tribromide are constantly employed in medications by the manufacturing chemist.

The antiseptic and deodorant properties of copper oxide have

rendered its use valuable for some time in the preparation of cements for filling dental cavities. Recent researches at the New York Quarantine Station have shown that sulphate of copper and hydroxide of copper are among the most valuable deodorants and disinfectants we possess, and promise to revolutionize the processes of water purification in the future. By the use of an equal weight of quicklime in combination with copper sulphate, the hydroxide of copper is precipitated as the active agent of the mixture. Its action is both mechanical and chemical. The insolubility of the cupric hydroxide in water renders its use as a water-purifying agent particularly valuable.

Whether the therapy of radium will cause it to be admitted to any future Pharmacopœia or to be employed in manufacturing pharmacy is a matter difficult for conjecture. The metal was valued at $55,000 an ounce in November, 1903, but has advanced since to $900,000 an ounce. The great increase in the cost is due to the fact that the Austrian Government practically cornered the world's supply of the precious metal and refuses to permit even a grain being exported. Most of that exported prior to 1903 has found its way into the cabinets of wealthy collectors and scientists and is being held as a curiosity or for private experiments.

Regarding tinctures, it is important to learn that in the new Pharmacopœia just being issued, the strength of tincture of aconite root has been reduced from 35 to 10 per cent. and tincture of veratrum viride from 40 per cent. to 10 per cent. It is said that this was done in accordance with the plan of the International Convention held at Brussels two years ago, to make all tinctures of potent drugs of a uniform strength. This country is the first country in which the recommendation has been officially adopted, with some exceptions.

The employment of synthetic remedies, first introduced in this country about two decades ago, has had its influence on pharmaceutical manufacture. The number of synthetics employed as remedial agents is steadily increasing. While some of them have come into disrepute as medicinal agents and their use as such discontinued, new ones are being introduced from time to time to take their places. Thus it is customary for the physician in prescribing to relieve pain, instead of using old-time remedies to remove the cause of the pain, he removes the pain almost instantly by the use of a synthetic

remedy, regardless of cause. Owing to the greater cost of synthetics this condition of affairs has deprived the retailer of a share of his revenue derived from prescriptions, the use of the old-time remedies being more profitable to the prescription pharmacist.

The Pharmacopœia as an authoritative standard has served as a guide to both retailer and manufacturer. The names of Procter, Maisch, Rice and Prescott, in connection with the United States Pharmacopœia and in the field of scientific pharmacy, should always be remembered with honor and gratitude. The use of an authoritative standard for fixing the strength and quality of medicines is quite apparent, and is recognized by every civilized country. In this country conformity to the standards of the Pharmacopœia is a matter of choice, not compulsory, hence the Pharmacopœia does not always receive recognition as an authority. A deplorable feature of manufactured pharmaceutical preparations to-day is their lack of uniformity. The market is flooded with preparations under pharmacopœial names which differ in character so that they will not even mix with one another, although being marketed under identical names. It is not an uncommon occurrence to hear a pharmacist say that he mixed two fluids, one prepared by Mr. Brown and the other by Mr. Jones, and the result was an unsightly precipitate. If pharmacopœial standards were adhered to such a state of things could not exist. The advance in pharmaceutical knowledge has made possible many improvements in processes of manufacture, which is taken advantage of in many instances to reduce the cost of production. In most instances, perhaps, where deviations of official formulæ are resorted to, it is induced by sharp competition in which the manufacturer adopts a less expensive formula or process to make a preparation equally as good as the official product at less cost. The argument that the advance in pharmaceutical knowledge at the present time makes possible many improvements in the processes does not hold good when applied to official preparations. Physicians have a right to demand uniformity in the official preparations. In the first place, the absolute proof of its being an improvement over the official method, and, secondly, the proof that the product is identical with the pharmacopœial product, would have to be established. It should be quite apparent, therefore, that the result of non-adherence to pharmacopœial methods is disastrous to professional and public interests. When the pharmacopœial method or standard is not

adhered to in the manufacture of a preparation, the label should specifically state how it differs from the pharmacopœial standard so that the buyer may be made aware of the fact that it is not an official product, and thus make it possible for him to choose between the official and the unofficial preparation.

The manufacture of unauthorized proprietary pharmaceutical preparations or specialties, many of which possess undoubted therapeutic merit, has been regarded as a growing evil during the past decade. While such preparations cannot be officially recognized until divested of all secrecy and proprietary claims, the fact of their possessing therapeutic merit entitles them to recognition, provided the proprietors or manufacturers publish full knowledge concerning them for the benefit of science and relinquish all proprietary claims to the same, relying upon the adoption of work marks or brand names to properly distinguish their brand. Only when such conditions are complied with by manufacturers, can the proprietary preparations or specialties be classified as pharmaceutical products, subject, of course, to standardization, and their use authorized for pharmaceutical purposes.

With the advent of the new Pharmacopœia just being issued and correct standards, the field of manufacturing pharmacy provides vast possibilities in the future. As in the past, the manufacturing chemist will draw his crude material from nature's green fields and from the bowels of the earth. The animal kingdom will contribute even a greater number of products to materia medica than it does at present, and the manufacturing chemist, unlike the alchemist of old, will have his processes illumined by the light of scientific knowledge to guide him in the manufacture of medications complying with pharmacopœial standards for the benefit of mankind.

NATIONAL PHARMACY COMPANY,
SAN FRANCISCO, CAL.

THE EVOLUTION OF THE CHEMICAL MATERIA MEDICA.

DR. FRIEDRICH SPERLING, in the appendix to an address on "The Materia Medica Once and Now," delivered before the Austrian Pharmaceutical Association at Vienna, March 11, 1905, gives a chronologically arranged list of the introduction of some of the more important chemical medicaments.

The list itself is published in the *Pharmaceutische Post* (1905, page 175) and from it the following has been abstracted:

SUBSTANCES KNOWN TO THE ANCIENTS.

Sulphur; this substance is mentioned in the oldest scientific works.

Ammonium chloride; sal ammoniac was known to Herodotus and is said to have been discovered in the neighborhood of a temple dedicated to Jupiter Ammon, in Libya.

Realgar and sulphide of antimony.

Potassium carbonate; known to Dioscorides.

Sodium carbonate; supposed to be identical with potassium carbonate. Identified by Duhamel in 1736, and Marggraf, 1759.

Gypsum, lead carbonate, lead oxide, iron, ferrous sulphate, alum, zinc ores, zinc oxide, known as cadmia or pompholix, to the alchemists as "Lana philosophica," or, on account of its resemblance to snow flakes, "Nix alba."

Gold, silver, copper, as "Aes cyprium."

Cupric sulphate; known to the Greeks as chalcanthum, to the Romans as atramentum sutorium. More closely described by Basilius Valentinus. Directions for making were given by Van Helmont, 1644, and Glauber, 1648.

Mercury; known to Aristotle.

Vinegar, lead plaster, soap; the earliest descriptions are found in the works of Pliny.

Potassium bitartrate; in the crude state this was known to the Greeks and Romans, to the latter as "Fæx vini."

Oil of turpentine.

Sodium chloride.

[*To be continued.*]

AMERICAN PHARMACEUTICAL ASSOCIATION.

FIFTY-THIRD ANNUAL MEETING.

The fifty-third annual meeting of the American Pharmaceutical Association was held at Atlantic City, September 4th–9th, the Hotel Islesworth being the headquarters of the Association. Considering that the meeting was held so far from the geographical center, the attendance was fair, representatives being present from the extreme limits of the States, Canada and one from England. Whatever may be said of the status of American pharmacy as a whole, and while some may regret that the membership of the Association is not larger, it must have been apparent to every one who attended the Atlantic City meeting, that the Association is doing a great work, and that its members are not only cognizant of the needs of their calling, but that they are doing all in their power to advance and safeguard the interests of that calling, be they educational, scientific, commercial or otherwise. In fact, the American Pharmaceutical Association may be looked upon as the clearing-house of American pharmacy, as stated by one of the delegates, Thos. F. Main.

FIRST GENERAL SESSION.

The meeting was formally opened on Monday afternoon, September 4th, with the president of the Association, James H. Beal, of Scio, O., in the chair. Addresses of welcome were made by Mayor F. P. Stoy, of Atlantic City, H. H. Deakyme for the local drug association, and by Dr. W. C. Alpers, representing the New Jersey Pharmaceutical Association. Responses on behalf of the Association were made by the following members: Dr. George F. Payne, Atlanta, Ga.; Leo Eliel, South Bend, Ind.; and by Prof. H. P. Hynson, of Baltimore.

The official delegates and others were then called upon, and among those who spoke were the following: N. H. Martin, Gateshead-on-Tyne, England; Prof. J. M. Hargreaves, delegate from the Ontario College of Pharmacy; Thos. F. Main, delegate from the National Wholesale Druggists' Association; Dr. Reid Hunt and Albert M. Roehrig, representing the Public Health and Marine Hospital Service; W. S. Douglas, delegate from the Proprietors'

Association of America; Geo. H. Klock, representing the U. S. Navy; and Prof. Joseph P. Remington, who replied to the delegates.

Vice-President P. C. Candidus was called to the chair while the presidential address was delivered. This address was pleasing in a rhetorical sense and in other ways left little to be desired. President Beal, taking as his theme "The Mission of the American Pharmaceutical Association," kept well within practical and common-sense lines, at the same time interpreting the signs of the times in pharmacy as indicative of better things to come, or "that we are in the midst of changes which, when accomplished, mean no less than a revolution in the ancient order of things." Among the subjects dwelt upon by the speaker were the relation of the pharmacist to the law, and the pure food and drug laws. Concerning the former he said: "Not the least important duty of our Association is to formulate and, as far as possible, to disseminate correct ideas concerning the pharmacist in his relation to the law, a subject that within the past few years has attained an importance almost vital to the existence of our vocation." In regard to the latter subject, he said: "With the purpose and intent of these laws every honest man must be in sympathy; against the practical effect of some of them every intelligent man who is acquainted with the facts must protest." In concluding this portion of the address the President made the following recommendation:

In view, therefore, of the great and constantly increasing importance of this subject to the practice of pharmacy, I recommend that the President be instructed to appoint, or that the Association or its Council select, a committee of discreet and competent persons to take into consideration the legal definition of adulteration, especially as applied to the use of preservatives, and to report their conclusions at the next annual meeting of this Association; this report, when approved, to be made the subject of a communication to the general public and to the Governors of the various States, in order that the average citizen may have the opportunity of learning the facts concerning the use of preservatives.

The address, which contained several other recommendations, was referred to a committee consisting of Edward Kremers, Henry Kraemer and R. G. Eccles.

The minutes of Council were read by its secretary, H. M. Whelpley, and adopted.

Chairman H. P. Hynson, of the Committee on Exhibits, reported

that twenty-eight firms had made displays, and that the proceeds from this source would be approximately $1,000.

The following Committee on Time and Place of Next Meeting was announced: A. E. Ebert, F. E. Stewart, C. G. Merrell, Caswell A. Mayo and F. C. Godbold.

SECOND GENERAL SESSION.

After the reading of the minutes of the first session the report of the Nominating Committee was presented by its secretary, C. S. N. Hallberg, whereupon the following officers were elected for the ensuing year:

President, Joseph L. Lemberger, Lebanon, Pa.; First Vice-President, Charles Holzhauer, Newark, N. J.; Second Vice-President, Charles A. Rapelye, Hartford, Conn.; Third Vice-President, F. C. Godbold, New Orleans, La.; Treasurer, S. A. D. Sheppard, Boston; General Secretary, Charles Caspari, Jr., Baltimore; Reporter on the Progress of Pharmacy, C. Lewis Diehl, Louisville, Ky.; Members of Council, James H. Beal, Albert M. Roehrig and Wm. Mittelbach. At the final session Edward Kremers was elected to fill the vacancy on the Council made by the election of Mr. Lemberger to the presidency.

During the reading of the minutes of Council the Secretary stated that the Association then had 1,776 members, the largest membership in its history. The work of Wm. Mittelbach, chairman of the Committee on Membership, was praised, and a special vote of thanks tendered him by the Association for his services.

The Treasurer, S. A. D. Sheppard, presented a report covering the period from July 1, 1904, to July 1, 1905, to the effect that the money handled by the Association during this period was $12,702.17, and that the balance to its credit was $4,095.18.

The Secretary, Charles Caspari, Jr., read an itemized financial report for the year.

The Committee on National Formulary presented through its chairman, C. Lewis Diehl, a report which was received and referred to the Section on Practical Pharmacy and Dispensing.

The Committee on President's Address reported through the chairman, Edward Kremers, and the following recommendations were approved by the Association:

(1) The establishment of a monthly bulletin by division of the matter now appearing in the annual volume of proceedings.

(2) That one unofficial trial be given the Association at large to vote for officers.

(3) That the General Secretary and the members of the Association who are residents of Canada be constituted a committee to consider the establishment of a Canadian Section and to report upon the matter to Council.

(4) That the Council be instructed to invite propositions from responsible publishing houses for the publication of the National Formulary upon such terms as will insure its most extensive circulation and at the same time yield the greatest financial return to the Association.

(5) That the incoming president be instructed to appoint special membership committees as follows: (*a*) To solicit members from the faculties and student bodies of the colleges of pharmacy; (*b*) to solicit members from the boards of pharmacy; (*c*) to canvass the State and local pharmaceutical associations; (*d*) and to look after lapsed and suspended members.

(6) The recommendation on the use of preservatives was referred to the Scientific Section.

In presenting the report of the Committee on National Legislation, Chairman A. E. Ebert strongly urged the Association either to extend the jurisdiction of the present committee or to appoint a new committee to consider the whole subject of legislation, both state and national, not only for the purpose of securing uniform laws regulating such practices as the indiscriminate sale of narcotics, which was declared to be very important, but also for the purpose of securing jurisdiction in matters of legislation of special interest to pharmacists. A motion by C. A. Mayo to amend the by-laws so as to provide for the recommendation by Mr. Ebert, was carried.

The report of the delegates to the Section on Pharmacology of the American Medical Association was presented by C. S. N. Hallberg and referred to a special committee composed of M. I. Wilbert, George M. Beringer and George B. Kauffmann.

HISTORICAL SECTION.

Albert E. Ebert, Chairman. Caswell A. Mayo, Secretary.
Edward Kremers, Historian.

The Historical Section held one session, this being on Tuesday evening. In his address the Chairman outlined the duties of the three officers of the Section, he holding to the position that the work of the chairman and secretary should be mainly executive, while the historian should be free to devote his time to collecting, editing and conserving matter of historical interest. The Chairman

recommended that the Association provide membership for the Section in the American Historical Association and the American Geographical Association, whose publications are extremely valuable, and this was approved.

H. M. Whelpley presented on behalf of the Illinois Pharmaceutical Association, an historical gavel, which had been presented to that association by President Patterson.

The Secretary presented a report on the status of the pharmacists in the Army and Navy during the Civil War, and said that he was of the opinion "that the Association had erred in attempting to raise the status of the hospital steward, and that it would have been better to have proposed the organization of a wholly new pharmaceutical corps composed entirely of highly skilled parmacists who should all be commissioned officers." Mr. Ebert spoke of the efforts which had been made to raise the standard of army steward, and said that Dr. Senn, when consulted upon this question, had suggested the revival of such an office as existed during the Revolutionary War, and that President McKinley favored the creation of the office of apothecary-general.

The following papers were presented: "The Recorded History of the Pharmacy of the Civil War," by M. I. Wilbert, in which reference was made to some six or seven papers extant on this subject; two papers by H. M. Pettit, which were read by title, one of them being on "Reminiscences of the Pharmaceutical Service in the Confederacy;" "Confederate Resources," by C. H. Thibault, which was presented by E. G. Eberle.

The Historian made a report in which he called attention to the manner in which the archives of the Section are being cared for.

E. H. Gane presented to the Section the first device which was used in this country for the gelatin-coating of pills, which was used about 1869 or 1870.

Other papers presented to the Section were as follows: "The National Retail Druggists' Association" and the "Kings County (N. Y) Pharmaceutical Society," by E. A. Sayre; "The Drug Trade in Cleveland Prior to 1875," by Joseph Feil; "Reminiscences from Watertown, Wis.," by Dr. E. W. Johnson; "A Directory of Baltimore Druggists in 1833," and "A Biographical Sketch of George Wansey Andrews, of Baltimore," by John F. Hancock; "A Biographical Sketch of Chas. Caspari, Sr.," by Chas. E. Caspari; "First

Call and First Four Meetings of the A. Ph. A.," and "The Drug Periodicals of Missouri," by H. M. Whelpley; "Early History of the A. Ph. A.," by Thos. S. Wiegand; "A Contribution to the History of Pharmacy in Texas," by E. G. Eberle; "The Department of Pharmacy of Vanderbilt University," by J. T. McGill, and "American Hospital Formularies," by M. I. Wilbert. H. P. Hynson presented "A List of the Professional Pharmacies in the United States."

Original manuscripts and other matters of historical interest were presented by various members: Professor Diehl, the original manuscripts of the "Reports on the Progress of Pharmacy," prepared by him in 1867 and 1868; Miss Adelaide Rudolph, a scrap-book containing letters of Dr. Chas. Rice and clippings of articles relating to him, particularly since his death; M. I. Wilbert exhibited a scrap-book of photographs and historical prints relating to pharmacy.

The archives of this section were enriched the past year by the Hoffmann collection of books, manuscripts, etc. The details connected with the importation of this collection were looked after by Messrs. Schimmel & Co., of Leipzig, and by Messrs. Fritzsche Brothers, of New York, who also defrayed the expenses connected therewith, and for which the thanks of the Section were voted them. A motion to thank Mrs. Hoffmann for the donation was also adopted.

The following officers were elected: Chairman, John F. Hancock; Secretary, C. S. N. Hallberg; Historian, Edward Kremers.

SECTION ON EDUCATION AND LEGISLATION.

Harry B. Mason, Chairman. Francis B. Hays, Associate.
William L. Cliffe, Secretary.

The Section on Education and Legislation was convened on Wednesday, and held two sessions. Francis B. Hays was called to the chair while the address of the Chairman was presented. The address, which gave a resumé of the year's progress, was clear-cut and dealt with the educational problem in pharmacy in a way which all those who have this subject at heart would wish to have it treated. It was pointed out that pharmacy has unquestionably entered upon a new era in educational requirements, and the importance of establishing definite entrance and curriculum standards in the prerequisite laws hereafter to be enacted was emphasized.

The report of the Secretary, which gave certain registration sta-

tistics and references to the new pharmacy laws, was read and adopted.

A report by E. G. Eberle on "The Antinarcotic Legislation of the Year" was, on motion, read by title.

The report of the special committee on a Model Graduation Prerequisite Law was presented by the chairman, J. H. Beal, and after considerable discussion was adopted as read. The report embodied the following resolution:

Resolved, That it is the sense of the Section on Education and Legislation of the American Pharmaceutical Association that when graduation from a college of pharmacy is required as a prerequisite to registration, the college course should be preceded by a general education at least the equivalent of one year in a high school, and that Boards of Pharmacy should increase this standard to that of high-school graduation as rapidly as conditions in the several States will permit.

The report of the special Committee on Pharmaceutical Degrees, which was a majority report, was presented by the chairman, Charles Caspari, Jr. Action on the report was, however, postponed until after certain papers having a bearing on the subject under consideration had been presented. These were: "Why the Doctorate Degree should be settled upon in Pharmacy," by Henry P. Hynson; "Why the Doctorate Degree should not be settled upon in Pharmacy," by Edward Kremers, and one of similar purport by J. T. McGill, supplementing the committee's report. After considerable discussion two of the three recommendations made by the committee were adopted. They are as follows:

(1) It is recommended that the degree of Graduate in Pharmacy (Ph.G.) be granted by colleges that comply with the minimum requirements adopted by the Conference of Pharmaceutical Faculties at its last session, September 8, 1904.

(2) It is also recommended that the degree of Pharmaceutical Chemist (Ph.C.) be granted on the following conditions: The college desiring to confer the degree should require as a minimum for entrance two years of complete work in a high school, or its equivalent. College work to consist of at least 750 hours of lectures and recitations and 900 hours of laboratory work.

A substitute for the third recommendation of the committee, offered by Henry P. Hynson, was, after an amendment by E. H. Bartley, adopted. This was to the effect that it was the sense of the Section that the degree of Doctor of Pharmacy should be

granted only by those colleges giving a three years' course, and having an entrance requirement of two years in a high school.

Among the papers read were the following:

"The Nomenclature of Proprietary Medicines," by C. S. N. Hallberg, calling attention to the lack of system in nomenclature, and declaring that scientific nomenclature should be required of all medicines.

"Why the Mann Bill should be enacted," by George M. Beringer, and "Why the Mann Bill should not be enacted," by W. H. Burke, the latter being read by title.

"The Sale of Alcoholic Liquors by Pharmacists," by Clement B. Lowe.

Of the papers received the following were read by title: "The New Graduate Prerequisite Amendment in Pennsylvania," by Joseph P. Remington; "Trade Training in Pharmaceutical Schools," by Oscar Oldberg; "The Four Years' Experience Prerequisite," by J. T. McGill; "The Pharmacist, the Physician and the Hospital," by F. E. Fisk; "The Relation of Boards of Pharmacy to the Organized Boards of Pharmacy," by Murray G. Motter; "National Boards of Pharmacy," by G. Wolff. A paper by R. G. Eccles, on the "Effects Upon the Community of the Use of Preservatives in Foods and Beverages," was referred to the Scientific Section.

The election of officers resulted in the choice of Oscar Oldberg, chairman, and Joseph W. England, secretary. The following associates were chosen: George M. Beringer, J. T. McGill and D. F. Jones.

SCIENTIFIC SECTION.

E. H. Gane, Chairman. Daniel Base, Associate.
Chas. E. Caspari, Secretary.

Beginning on Wednesday evening, this Section, including an adjourned session on Friday afternoon, held three business sessions.

Professor Base presided while Mr. Gane read his address. The address was both timely and suggestive, and ought to help in directing the efforts of the Section, as well as the Association at large, along lines which appear to have been neglected, and which rightly lie within the province of applied scientific pharmacy. While in no way disparaging the work of the Scientific Section, it was pointed out "that pharmacy is not in any sense a pure science," but that "it

should be one of the greatest of applied sciences, and the pharmacist should occupy as high a position as the physician or the chemist . . . Side by side with investigations in pure science, we need to give more attention to the problems confronting the practical pharmacist which require for their solution the aid of our scientific investigators. What hope is there of securing due recognition of the applied science of pharmacy when the perhaps more fascinating field of pure science attracts most of our most capable workers?" The address, which should be read in full and which we hope to publish in a later issue of this JOURNAL, was referred to a committee composed as follows: W. A. Puckner, E. H. Bartley and Samuel P. Sadtler.

The Committee on Ebert Prize announced through its chairman, H. H. Rusby, that the prize had been awarded to Prof. Ernst Schmidt, University of Marburg, for his paper entitled "Concerning Choline, Neurine, and Allied Compounds."

The report of the Committee on the Drug Market was presented in the absence of the chairman, E. L. Patch, by Lyman F. Kebler. The report was adopted, as was also the following resolution, which was referred to the General Session:

Resolved, That the American Pharmaceutical Association earnestly condemns the use of any form of wood alcohol in any pharmaceutical or proprietary preparation, whether designed for internal or external medical use, or to be applied as a toilet lotion.

The following papers were presented:

Scopoline. By Ernest Schmidt. Presented by Edward Kremers. This paper presented a continuation of the report made by the author to the Association in 1892. The study of the constitution of scopoline was conducted along parallel lines to those which had proved successful in revealing the structure of tropine, tropidine, tropinone and related compounds. The author, however, arrived at the conclusion that the analogy, assumed for the purpose of rational investigation, was not upheld by the facts revealed by the experiments reported. Three lines of investigation were presented: (1) Attempts to remove the oxygen, (*a*) dehydration, and (*b*) indirect reduction; (2) the distillation of scopoligenine, with zinc dust in an atmosphere of hydrogen resulting in the formation of pyridine, and (3) oxidation with (*a*) bromine (yielding scopoligenine), (*b*) with hydrogen dioxide (yielding an unstable oxidation product), and (*c*)

with chromic acid (yielding, among other substances, an oxygen free base).

The Influence of Alkaline Substances upon Oxidation Processes. By E. Schaer. Presented by E. Kremers. These influences were discussed according to the nature of the oxidation, under three classes: (1) Oxidations produced by the salts of heavy, more particularly, noble metals (*e. g.*, Fehling's solution, etc.); (2) intra-molecular oxidation (*e. g.*, guaiac blue, quinone, benzoyl peroxide, etc.); (3) spontaneous oxidation with the formation of more stable and more highly oxidized products. The paper presented a resumé of the work done at the Pharmaceutical Institute of the University of Strassburg, and elsewhere, and published in journals and proceedings of several countries. The author concluded his essay with the statement that the activating influence of alkalies, even of the weakest ones, was so far-reaching in processes of oxidation and auto-oxidation that their presence could no longer be ignored in chemical and pharmaceutical work.

Chemical Examination of Grindelia. By Frederick B. Power and Frank Tutin. Presented by Chas. Caspari, Jr. The drug used for this examination was considered to be *Grindelia robusta*, one of the varieties of the latter or a closely related species, it having been procured in an original package directly from California. The authors conclude from their work (1) that the chief constituents of *Grindelia* are amorphous resins, to which its medicinal value is probably to be attributed; (2) *Grindelia* contains a considerable amount of a lævo-rotatory sugar, apparently *l-glucose.* It also contains *proteid substances*, amorphous coloring matter and tannin, and an exceedingly small amount of an *essential oil*, possessing the characteristic odor of the drug; (3) they are unable to confirm the observations of previous investigators respecting the presence of a saponin or an alkaloid.

Contribution to the Chemistry of Chelidonine. By J. O. Schlotterbeck and Burton S. Knapp. Chelidonine is the principal alkaloid of *Chelidonium majus* and *Stylophorum diphyllum.* Its formula is $C_{20}H_{19}NO_5,H_2O$ and melting point 136°. It contains one hydroxyl and forms beautiful acetyl and benzoyl compounds. Saturated with HCl gas at 20° and then allowed to stand in a sealed tube for six days at ordinary temperature, chelidonine seems to be converted into amorphous tri-chelidonine. Fusion with alkali gives a phenolic body, probably proto-catechuic acid. Zinc dust distillation does not

yield phenanthrene, but merely amines, ammonia and pyrrol. Treatment with PCl_5 in the cold gives a mixture of white amorphous mono-chlor-chelidonine $C_{20}H_{18}ClNO_4$ and an amorphous leuco compound containing one less hydrogen, $C_{20}H_{17}ClNO_4$. Treatment with PCl_5 with heat gives a mixture of the two compounds mentioned and in addition a colorless crystalline chlor-base, containing two less hydrogens and giving bright red crystalline salts with acids. The hydrochloride has the composition $C_{20}H_{15}ClNO_4,5H_2O$. The mono-chlor base is converted into the leuco base and the latter into the color compound with PCl_5. The leuco base is easily converted into the color base with halogens. The color base is reduced to the leuco base with reducing agents. Further work may show a close relationship with sanguinarine, which is also colorless in the free state and bright red in the form of salt. Mixture of nitric and glacial acetic acids oxidizes chelidonine, in the cold and on long standing, to a beautifully crystalline acid melting above 300°.

Owing to the small percentage of alkaloid in the drug, the work is necessarily tedious, and its continuance is dependent upon additional supplies of the drug. In this connection the authors acknowledged with thanks an offer of Messrs. Merck & Co. to furnish larger quantities of drug.

On the Crystalline Alkaloid of Calycanthus Glaucus. (Second paper.) By H. M. Gordin.

The subject of this paper, which was read by title, is a continuation of the research upon calycanthine, the active alkaloid of *Calycanthus glaucus.* In a previous paper the preparation and analysis of calycanthine and its salts with the halogen acids and chloroplatinic acid were given. In the present paper the preparation and analysis of the salts of calycanthine with oxyacids, with chlorauric acid and mercuric chloride are described as well as the first attempts to get some idea of the constitution of the alkaloid. The salts prepared are as follows: A neutral and an acid sulphate, a nitrate, a picrate, a chloraurate, two oxalates and a double salt of calycanthine hydrochloride and mercuric chloride. The sulphates, the nitrate, the picrate and the neutral oxalate were found to have the normal composition. The acid oxalate, the chloraurate and the mercury salt have an abnormal composition, all containing an excess of base or of its hydrochloride. No tartrates could be obtained in orms suitable for analysis. It is shown that the alkaloid is a sec-

ondary base forming a nitrosamine when treated with nitrous acid. It also contains a methyl group attached to a nitrogen atom. The alkaloid forms a sulphonic acid when treated with strong sulphuric acid and gives several methyl derivatives when treated with methyl iodide. Of these one is a quaternary base not precipitable by sodium carbonate from the aqueous solution of its salts.

An Improved Form of Retort Stand for Druggists' Use. By J. P. Remington, Jr.

The author described the construction of a retort stand consisting of an iron base, an upright of wrought-iron pipe (¼ inch), with a set of ingeniously constructed clamps, into which the shafts of the rings fit and can be securely fastened to the upright at any time and in any position.

The novel feature of this retort stand consists in the construction of the clamp, which is shaped like the letter U, with two holes in the ends through which the shafts of the rings are run and fastened securely by a thumb-screw in the curved end of the clamp.

Drugs Which are Specially Liable to Substitution. By H. H. Rusby. Quite a number of vegetable drugs were considered, and in each case samples were exhibited showing the points of resemblance or difference between the spurious and genuine drugs.

In discussing this subject Professor Hallberg said that it was evident that crude drugs should also be inspected, and that we had not progressed much since 1852, when the Association was organized for the purpose of having imported drugs inspected. Dr. R. W. Moore said that there is an excellent law on this subject, which, however, does not recognize certain standards. He said that in New York the work is done thoroughly, but he could not speak in regard to other ports. One of the questions which arose was whether a drug deficient in constituents might not be used to work into products, but not allowed to go to the consumer.

The Quality of Drugs Coming into New York. By R. W. Moore. The author outlined the methods used in most of the custom houses, and cited examples to show where the quality of imported drugs had been improved as a result of the rejection of those below the standard.

This paper was also the occasion for considerable discussion, in which Messrs. Hallberg, Wilbert, Moore, Eccles and Beringer took part. Mr. Wilbert asked if the work of inspection was not being

carried on under the law of 1849, and said that the department is using standards no longer official. He said that we seem to have no way to cope with this question, as a drug rejected in one port may be admitted at another. He then recommended that the matter be referred to the Committee on Legislation, which was approved.

The Adulteration of Chemicals. By L. F. Kebler. In order to arrive at a proper understanding of the amount of adulteration in chemicals, it is necessary to clearly define what is meant by adulteration. Gross, deliberate sophistications of chemicals by manufacturers, jobbers and brokers do not, in the experience of the writer, amount to 1 per cent. If, however, those chemicals are classed as adulterated which do not conform to well recognized standards of quality or which fall below the professed standards under which they are sold, approximately 25 per cent. are adulterated. Such adulterations are due to a deficiency in strength in some cases, and more often to the failure of the manufacturer to sufficiently purify his chemicals.

Dr. Eccles remarked at the close of the paper that by using the word "adulteration" a false impression is given; that adulteration of drugs in the eyes of the public is an entirely different question. Benjamin T. Fairchild said that Dr. Eccles had referred to an important matter, and that something should be done to remedy it. He said that nearly all drug laws read that when a drug falls below a standard it is adulterated, which is not the case.

Drug Plant Investigations of the Department of Agriculture. By R. H. True. These consist of field and laboratory investigations. Field work includes the working out of practical methods of growing drug plants and of curing the product. It also includes (1) plants and products now imported from other countries for which our country furnishes suitable conditions; *e. g.*, opium poppy, camphor, licorice, belladonna, etc. (2) The utilization of plants now neglected, especially weeds; *e. g.*, stramonium, burdock, yellow dock, etc. (3) The domestication and cultivation of valuable wild drug plants now becoming commercially rare; *e. g.*, golden seal, which was stated to be one of the most difficult of the problems presented.

Field work is carried on in Vermont, District of Columbia, South Carolina and Texas.

Laboratory work at Washington, D. C., embraces histology, chemical plant physiology and pharmacology.

Estimation of Caseine (a preliminary study). By H. V. Arny and T. M. Pratt. To be published in a later issue of this JOURNAL.

Gelsemium Root. By L. E. Sayre. Presented by Chas. Caspari, Jr. A comparison was made of the fresh and dried root. By the process of alkaloidal extraction a quantitative estimation of the fresh and dried root was made; the comparative estimation being based mainly upon alkaloidal content. Physiological data were also referred to.

The three following papers were presented by W. A. Puckner:

Estimation of Caffeine in Presence of Acetanilide. In estimating acetanilide and caffeine in headache remedies the extraction of both from an acid medium by means of chloroform and the subsequent precipitation of caffeine as periodide suggested itself. The details are given which lead to the adoption of a method in which acetanilide and caffeine are extracted by chloroform in presence of sulphuric acid, the chloroform distilled off, the residue dried to obtain caffeine plus acetanilide. From this residue the caffeine is then extracted, precipitated with iodine, the periodide decomposed with sodium sulphite and the caffeine extracted with chloroform.

Notes on the Estimation of Caffeine. Experiments made to determine the conditions under which caffeine may be dried without loss, show: (*a*) If caffeine, dried at 95°, is dissolved in water or chloroform, evaporated at a room temperature and dried over sulphuric acid, practically the original weight is obtained. (*b*) If caffeine, dried at 95°, is dissolved in chloroform, the solvent evaporated from a shallow dish at 50°–60° and dried at this temperature practically the original weight is obtained. While vaporization can be demonstrated, it is not sufficient to affect the results of quantitative work. (*c*) From a chloroform solution of caffeine the solvent may be distilled off and the residue dried at 95° without loss of caffeine. If, on the other hand, the solution is contained in a shallow dish and after evaporation is dried at 95°, then an appreciable loss of caffeine occurs. Tasilly's conclusions, that caffeine does not become anhydrous, even if dried at 110°, were in a measure confirmed.

The Estimation of Acetanilide. Incidental to the estimation of acetanilide in certain headache remedies it became desirable to make experiments relative to the temperature at which ether or chloroform, this having been used to separate it from other constituents, could be expelled and the residue obtained in condition for weighing. These experiments show that acetanilide is quite volatile at

comparatively low temperatures. From its ether or chloroform solution the solvent may be evaporated at room temperature and the residue brought to constant weight over sulphuric acid without loss of substance. If the solvent is distilled from a flask and the residue dried at 50°–60°, loss by volatilization is slight and a practically constant weight is attained in twelve to twenty-four hours. At 95° acetanilide is appreciably volatile even when contained in a narrow-necked flask. The residue obtained, when from an ether or chloroform solution the solvent is driven off, is not pure acetanilide, and if loss by vaporization is guarded against, high results are invariably obtained.

Plant Pigments, with Special Reference to the Quinhydrone Hypothesis of Plant Pigmentation. By I. W. Brandel and Edward Kremers. This monograph is the outcome of several years' work, which had its beginning in the discovery of thymoquinone, hydrothymoquinone and thymoquinhydrone in the oil of *Monarda fistulosa.* The introductory part consists of a historical review of the various hypotheses concerning plant pigments, practically all of which were based on little or no experimental evidence and equally devoid of an exact chemical basis. The first half of the paper proper is devoted to a chemical classification of all known plant pigments of known structure by referring them to their underlying hydrocarbons, and the classification of the latter primarily according to their degree of saturation. Some remarkable analogies have been revealed and generalizations as to color and constitution are given. The second half is devoted to a botanical classification of plant pigments, which not only gives some idea of the scope of the work done, but shows analogies that should be helpful in indicating the way for the future investigator. Still more, long-known facts that had been waiting for a rational interpretation are understood when observed from the point of view of the quinhydrone hypothesis.

A Bottle for Keeping Sterilized Pharmaceutical Preparations. By Henry Kraemer. This paper will appear in a later issue of the JOURNAL.

The Approximate Measures of the U.S.P. By M. I. Wilbert. The approximate equivalents for popular dose measures, directed in the eighth decennial revision of the U.S.P., appear to be based on the assumption that the metric system of weights and measures is closely related to, or dependent on, the weights and measures now

generally used in this country. The fallacy of this assumption and the consequent inaccuracy of the equivalents, as given in the Pharmacopœia, may be readily shown. A description was given of an easily applied method for determining the exact capacity of spoons of different sizes, makes and patterns. Attention was called to the approximate measures directed by other national Pharmacopœias and their relation to the actual capacity of spoons, and some reasons why the equivalents adopted in other countries should be carefully considered in this connection.

Medicinal Plants of Texas. By E. G. Eberle. It was stated that about fifty-one plants furnishing official drugs are found in Texas.

An Experiment in Hydrastis Culture. By J. U. Lloyd. Read by title. The experiments recorded show that *Hydrastis Canadensis* can be raised very easily by transplanting the entire root. Since the root bears prolific lines of reserve buds from end to end, any of which will sprout the year the cutting is made, it was stated that it is easy also to multiply the plants the season the cuttings are made. The influence of dry weather and winter conditions will be considered in another paper.

Japanese Lac, an Exudation from *Rhus Vernicifera.* By A. B. Stevens. One might conclude from the title of this paper that it would be of greater interest to the painter than to the chemist and pharmacist, but there are reasons why it is of interest to the latter. (1) Because it contains a non-volatile poison similar to if not identical with poison ivy. (2) It contains a gum said to be identical with gum arabic. (3) It contains a soluble enzyme which acts as an oxidizing agent. (4) The lac, when hardened by the action of the enzyme, is the most indestructible of any known lac, resisting the action of acid, alkalies and the ordinary solvents, as alcohol, ether, etc. The latter fact makes it especially serviceable in the manufacture of various utensils, such as developing trays, etc.

It was mentioned that it has been definitely proved that the toxic principle of *Rhus toxicodendron* is non-volatile.

An Expeditious Method for the Determination of Arsenic Trioxide. By Charles E. Caspari and Leo Suppan. The iodometric methods at present in use for the determination of arsenic trioxide involve a loss of time if the trioxide is dissolved at ordinary temperatures in sodium bicarbonate or an error due to the action of

iodine on sodium carbonate which is formed from the bicarbonate if solution is effected at higher temperatures.

The method described in this paper seeks to eliminate these difficulties and enables the determination of arsenic trioxide to be carried out in ten minutes with a maximum error of 0·2 per cent.

Owing to lack of time, a number of other papers were read by title. These were as follows:

Outlines for the Sampling of Drugs and Medicines. By Lyman F. Kebler. The importance of procuring representative samples for analytical work is sometimes overlooked and underestimated. The observations embodied in this paper are gleaned from practice and are presented with the view of bringing about some uniform system of sampling, and if possible to save some of the younger chemists many trying and at times embarrassing experiences.

The Organization and Working of the Drug Laboratory. By L. F. Kebler. In pursuance of an Act of Congress of June 30, 1902, authorizing the Secretary of Agriculture to investigate the adulteration of drugs in the United States, the Drug Laboratory was established. The chief assumed active charge March 1, 1903, and since that time three assistant chemists and a stenographer have been added to its working force. The work includes at present the following lines of investigation:

Testing of Chemical Reagents.—All chemicals purchased by the Bureau of Chemistry are examined here to insure the acceptance of reliable chemicals only, thus placing all competitors on an equal footing, and also for the purpose of securing data from which standards of purity can be constructed.

Analysis of Plant Drugs.—This involves the study of analytical methods and also of the influence of time on the properties of many potent drugs.

Cod Liver Oil Investigations.—An investigation of both American and Norwegian cod liver oils is now being conducted, in collaboration with the Division of Foods and the Bureau of Fisheries, to determine their relative values, chemically and medicinally. Thus far, the results indicate that the American oil is the equal of the Norwegian.

Work on Proprietary Medicinal Agents.—Much of this work is done at the request of the Post Office Department, to assist it in investigations of fraudulent products which are transmitted through the mails.

Compilation of Drug Laws.—All the laws of the different States and Territories are now being collected which relate to the adulteration of drugs and medicines.

The Drug Known as Pink Root. By W. W. Stockberger. Historical outline of knowledge of pink-root (*Spigelia marilandica*). Early confusion between this plant and *Spigelia Anthelmia* of West Indies, which confusion extended to chemical and physiological investigations. Later confusion between pink-root and *Ruellia* sp. which still persists and has crept into some recent text-books.

General substitution practised. *Phlox carolina* erroneously regarded as a considerable adulterant of Spigelia due to confusion of *Ruellia* with *Phlox.* Confusion extends to chemical work. "Phloxol" derived really from *Ruellia.* Differences, gross and microscopic, between Ruellia and Spigelia and Phlox pointed out. Not surprising that Spigelia should have taken less important place in medicine than formerly, since Ruellia is relatively inert.

Note on a Modification of Hehner's Test for Formaldehyde. By A. B. Lyons. Hehner's test is applicable only to milk or to a mixture of the suspected solution with milk. The milk contains proteids upon the presence of which the color reaction depends.

In the proposed modification of the test, beef peptone is substituted for the milk. It is essential that there be a correct proportion of the several reagents concerned in the test. In routine work, use for the reagent a mixture of the official tincture of ferric chloride in twenty or twenty-five volumes of strong sulphuric acid.

Place in a test-tube 2 c.c. of the solution to be tested (distillate if necessary). Add 20 milligrammes of beef peptone; shake the tube and add with a pipette 2 c.c. of the reagent, allowed to flow down the side of the inclined tube and so form a distinct layer at the bottom. Make a duplicate experiment, allowing one tube to stand for development of color zone, mix the contents of the other tube by shaking and observe change of color.

Limit of test, 1-4,000,000 formaldehyde.

Note on Some New Color Reactions and a New Reagent for Sucrose, Lactose, etc. By A. B. Lyons. Sulphuric acid and formaldehyde constitute a well-known reagent for morphine and its derivative alkaloids. Conversely morphine and sulphuric acid may be used for detecting formaldehyde. The test applied by the contact method will show hardly less than 1-20,000 formaldehyde in

aqueous solution. Addition to the reagent of a trace of ferric salt (chloride or sulphate) greatly increases its sensitiveness, so that it will give a color indication at dilution of 1-2,000,000. Other aldehyde bodies, however, react like formaldehyde.

In particular sucrose and lactose may be recognized, though not satisfactorily discriminated, by this reagent. In case of sucrose solutions 1-100–1-1,000, the color is distinctive, the violet blue obtained, as from formaldehyde, being surmounted by a yellow border, the two colors contrasting finely.

Obviously morphine (codeine and heroine) may be identified by using formaldehyde or sugar as a reagent, performing the tests exactly as when looking for formaldehyde or sugar. The test for formaldehyde is applicable only to distillates, and then is only of negative value. It cannot be applied to milk (before or after coagulation); neither can it be used to detect glucose in urine.

Method for the Analysis of Emulsions. By L. F. Kebler and Geo. W. Hoover. An examination of the literature shows that little has been done on the analysis of emulsions, and such results as are recorded are restricted almost exclusively to the determination of the fatty portion. Medicinal agents other than oils may, however, exert a beneficial effect and harmful agents may at times be present, and these agents must be taken into consideration. Further, the emulsifying agent may or may not serve the function of a nutritive.

Fourteen emulsions of known composition and eleven proprietary preparations were analyzed as completely as practicable, and from the data thus obtained a scheme of analysis has been formulated. The methods used are described, and the analytical data thus obtained by these methods are given in tabular form.

Vegetable Lecithin. By C. G. Richardson.

Pharmacological Notes on Two American Plants. By A. C. Crawford. Aqueous extract of Mountain laurel (*Kalmia latifolia*) given by mouth increases salivary secretion and causes vomiting, retching, paralysis and death. Post mortem shows hemorrhages into intestinal walls or mere vascular congestion. Action suggests in some respects pilocarpine group and the possibility of substitution medicinally, perhaps, after modification of principle of laurel considered.

Fluid extract or aqueous extract of Mistletoe (*Phoradendron*

flavescens) injected directly into vein of dog causes marked rise in blood pressure with rapid heart beat and increased urinary action. By mouth the action is uncertain.

A Contribution to the Chemistry of Bocconia Cordata. By J. O. Schlotterbeck and Walter H. Blome. *Bocconia cordata*, or tree celandine, is a native of Japan, but has been successfully grown in several countries. It was made the subject of investigation by Eijkman, Hopfgartner and Murrill and Schlotterbeck. The latter found five alkaloids, protopine, B-homochelidonine, chelerythrine, sanguinarine, and a fifth melting at 100°. In the present work 25 kilogrammes of drug were exhausted and only protopine and B-homochelidonine separated, of which 87 and 85 grammes respectively were obtained.

B- (Beta) homochelidonine may be converted into the y- (gamma) variety by melting and crystallizing from appropriate solvents. Heated with hydrochloric acid in a sealed tube methyl chloride is split off. The study of the water-soluble amorphous basic residue was not concluded.

It was found that when heated with alcoholic iodine under pressure, B-homochelidonine splits off no hydrogen as is the case with several related alkaloids.

Heated in chloroformic solution under pressure with PCl_5, a well-crystallized, yellow basic substance is obtained. Chlorine determinations demonstrated the product to be a hydrochlorate without any substitution of chlorine in the molecule. A number of combustions, though agreeing among themselves, failed to harmonize with any formula that would answer for chlorine. It is quite possible that a base and an acid result from this reaction. Calcium phosphate was found in abundance in the plant.

The Structure and Development of the Seed of Argemone Mexicana. By J. O. Schlotterbeck and C. R. Eckler. This is a microscopical study of the seed of the prickly poppy from the very youngest stages of the ovule to the ripe seed.

Aloes and the U.S.P. By M. I. Wilbert. On the necessity of taking cognizance of the history of medicinal substances in formulating an official description. The interesting history of aloes. Aloes in the earlier editions of the Pharmacopœia of the United States of America. The introduction and use of true Socotrine aloes. The introduction of purified aloes. The use of purified aloes in official

preparations. Some objections to the use of purified aloes. The article on aloes in the eighth decennial revision of the U.S.P. An enumeration of several of the more important or more evident shortcomings. The necessity for an official description of the powdered drug. The error of restricting the official aloes to varieties containing isobarbaloin. The evident mistake of continuing the use of purified aloes in the official preparations of that drug. A suggestion for a more rational solution of the problems involved.

Analysis of the Mexican Plant Tecoma Mollis. By L. F. Kebler and A. Seidell. The above plant is used in Mexico as a remedy, and an examination was made to determine its proximate principles. This plant is also said to be indigenous to Columbia, Peru and Chili, and to be known by the following synonyms: *Tecoma sorbifolia, H. B. K., Tecoma stans y velutina, DC, Stenolobium molle* and *Bignonia tecomoides, DC.* A careful examination of the literature dealing with medicinal plants failed to reveal any recorded investigation of this plant under any one of the names enumerated.

For this analysis the leaves only were used. Complete analyses by both the Dragendorff and Parsons methods were made. The results, which are given in full, show that *Tecoma mollis* contains no alkaloid or other well-characterized medicinally important plant constituent. It contains, however, a bitter principle soluble in dilute alcohol, to which is probably due whatever medicinal properties the plant may possess.

The Desirability of Using Uniform and Distinct Abbreviations for Periodicals, with a Suggested List. By L. F. Kebler. The desirability of using concise, clear and definite references in literature becomes apparent to any one who gives the subject only superficial thought. Particularly is this true of the pharmaceutical profession because of its cognate nature and the vast field covered. A few samples of references, found in the last volume of the proceedings of the Association, show how vague and useless some of them are.

Examples of a system to be followed in making abbreviations are outlined. The abbreviations cover such periodicals as are commonly met with in pharmaceutical work.

The report of the Committee on Chairman's Address was presented by W. A. Puckner, and recommended the formation of a Standing Committee on Drug Market, to consist of a chairman, secretary and three experts—a pharmacologist, a chemist and a microscopist

The recommendation made by President Beal in regard to the use of preservatives, which had been referred to this Section, was taken up and finally referred to a committee of five.

In the absence of Chairman A. B. Lyons, the report of the Committee on the U. S. Pharmacopœia was read in abstract by C. S. N. Hallberg.

The lecture on "Radium and Radio-Activity," by Prof. Charles Baskerville, on Friday evening, was one of the highly gratifying features of the meeting.

The new officers elected by this Section are Charles E. Caspari, chairman; Daniel Base, secretary.

SECTION ON COMMERCIAL INTERESTS.

Charles R. Sherman, Chairman. R. C. Reilly, Secretary.
Associates: Mathias Noll, F. C. Henry, O. W. Bethea

This Section met on Thursday afternoon, and held one session. After Mr. Sherman had presented his address he read a list of queries which the committee had suggested as of present interest to pharmacists. The queries were as follows:

(1) "Is there a tendency toward fewer and larger drug stores, and, if so, is this desirable?"

(2) "Granting that it is necessary for the pharmacist to handle ready-made medicines (patents), should he become the manufacturer of them himself and make his store their *habitat*, or 'farm out' this business?"

(3) "Can a dealer who ambitiously tries to become a merchant also hope to be known as a professional man?"

(4) "Viewed from its commercial bearing upon the drug business, is it desirable for those now in the business or who may embark in it hereafter to have prerequisite laws enacted in the various States?"

(5) "Is it not the exceptional case when a drug store of any size can exist on the business of physicians' prescriptions and sick-room merchandise alone?"

(6) "Should the Commercial Section of the A. Ph. A. be abolished entirely or receive more attention from members of the Association?"

(7) "To what extent may the pharmacist extend his commercial activities?"

Papers bearing on these and allied topics were presented by the following members: J. M. Alexander, Wm. C. Alpers, O. W. Bethea, S. L. Caine, E. G. Eberle, A. Fly, F. H. Freerichs, A. M. Hance, H. P. Hynson, H. B. Mason for B. E. Pritchard, Thos. D. McElhenie, Oscar Oldberg, Chas. E. Rapelye, Geo. H. Shafer for B. E. Pritchard, G. G. C. Simms.

The sixth query occasioned the most discussion, but there was a strong majority in favor of continuing the Section.

The election of officers resulted as follows: Chairman, H. P. Hynson; Secretary, H. D. Knisely; Associates, L. Wilcox, C. A. Rapelye, J. W. T. Knox.

SECTION ON PRACTICAL PHARMACY AND DISPENSING.

C. A. Rapelye, Chairman. W. C. Kirchgessner, Secretary.
Amanda W. Stahl, Associate.

Beginning Thursday evening this Section held two sessions. Dr. Alpers occupied the chair, while Mr. Rapelye read his address. The speaker expressed a doubt as to whether the present-day pharmacist can demand recognition as a professional man, and said, "but such a demand will be made in the near future, when higher education has accomplished its task, and when the uneducated boy will no longer have a place as an apprentice in a pharmacy."

The following papers were presented:

"A Revelation Prescription Case." By Wm. F. Kaemmerer.

"Combination Percolator and Shaking Tube for the Assay of Alkaloidal Drugs," and "A Simple Arrangement for Percolation with Hot Alcohol." By H. M. Gordin (both papers published in this JOURNAL, see page 463).

"Elixir of Thyme with Bromides and Atropine." By M. I. Wilbert. The following formula and directions were given for the preparation of this elixir:

Thyme	50·
Wild thyme	50·
Potassium bromide	8·
Sodium bromide	8·
Ammonium bromide	4·
Atropine sulphate	0·02
Sugar	200·
Alcohol, 20 / Water, 80 — Of each enough to make 1,000 c.c.	

The mixed drugs, in moderately fine powder, are moistened with 150 c.c. of the menstruum and allowed to stand in a closely-covered dish for twenty-four hours. The moist powder, after being thoroughly well stirred and mixed, is then packed moderately tight in a glass percolator, and sufficient of the menstruum is then allowed

to percolate through it to measure about 750 c.c. In this percolate the atropine sulphate and the bromides of potassium, sodium and ammonium are dissolved. The resulting solution is then allowed to percolate through the sugar, previously placed in a glass percolator, and sufficient additional percolate from the thyme mixture is subsequently added to make the total quantity of the resulting preparation 1,000 c.c.

"Practical Suggestions Based upon Long Experience." By G. G. C. Simms. The author called attention to a number of details and general principles in the practice of pharmacy which are frequently not properly observed.

"Echoes from the Compounding Laboratory, or Side-lights on Some Galenicals." By Frank E. Fisk. Quick methods were given for the preparation of tinctura opii camphorata, spiritus ammoniæ aromaticus, liquor ammonii acetatis, syrupus tolutanus.

"Solution of Peptonate of Iron and Manganese." By H. A. B. Dunning.

"Pharmacy of To-day." By E. G. Eberle.

"A Few Defects of Our New Pharmacopœia." By A. A. Kleinschmidt.

"Medicated Wines of the U. S. P.," by M. I. Wilbert, in which the retention of wines of potent drugs in the Pharmacopœia and the directions for making the majority of medicinal wines by dilution of fluid extracts are criticised.

A paper suggesting a method of calling the attention of physicians to the important changes of the U.S.P., eighth decennial revision, by George M. Beringer.

"Soap Solutions of Cresol." By C. S. N. Hallberg.

"Twenty Prescriptions." By Wm. F. Kaemmerer.

"My Vade Mecum." By T. D. McElhenie. After describing a closet for the storing of small articles, the author suggested the burning of waste paper, excelsior, hay, etc., by means of an old-fashioned confectioner's stove, instead of gas, as more economical.

"How to Keep Flaxseed Free from Bugs." By Wm. Mittelbach. The method proposed consists in placing a loosely-corked vial of chloroform in the bottom of the container.

"How to Keep Packages from being Oil-stained and Soiled." By the same author. An inside thin waxed wrapping paper was the remedy suggested.

"Women in Practical Pharmacy." By Amanda W. Stahl and Clara M. Malarkey.

"Benzine, Naphtha and Gasoline," and "Permanent Ointment of Red Mercuric Oxide." By Otto Raubenheimer.

The officers elected by this Section for the coming year were Wm. C. Alpers, chairman; H. A. B. Dunning, secretary; W. C. Gross, associate.

FINAL GENERAL SESSIONS.

The newly elected officers were installed at a special session on Friday afternoon, it having been the custom heretofore to reserve this ceremony for the final session on Saturday.

Of the various matters acted upon by Council and approved by the Association, the following may be noted: The appointment of a Committe on Publicity, consisting of Lewis C. Hopp and E. H. Gane; an honorarium to C. Lewis Diehl, as part compensation for his work on the National Formulary; authorization of the Treasurer to pay to the four drug journals—*American Druggist, Bulletin of Pharmacy, Druggists Circular* and *Merck's Report*—the $325 advanced by each of them for the publication of the semi-centennial index; the selection of C. S. N. Hallberg as editor of the A. Ph. A. Bulletin, Francis B. Hays as Reporter to Public Press, and of Frank H. Carter, of Indianapolis, as Local Secretary. The request from the Scientific Section that Council arrange so as to hold simultaneous sessions, and provide for three sessions of the Scientific Section, was referred to a committee consisting of Charles Caspari, Jr., F. H. Carter and J. L. Lemberger. The Commercial Section also made a request for another session.

A resolution offered by S. A. D. Sheppard, expressing appreciation of the presence of representatives of the Government at the meeting, and instructing the Secretary to express to the Secretary of Agriculture, the Surgeon-General of the Public Health and Marine Hospital Service, appreciation of the work done at Washington, of the papers presented to the Scientific Section and of the exhibits made in connection therewith, was adopted.

The report of the committee appointed to consider the report of the delegates to the Section on Pharmacology of the American Medical Association recommended that the A. Ph. A. commend all efforts to differentiate between the various so-called proprietary remedies with a view of correcting the abuses at present existing in

connection with the advertising pages of medical journals, which recommendation was adopted.

The Committee on the Wm. Procter, Jr., Monument reported that satisfactory progress had been made, and stated that it should be understood that work of such proportions could not be best accomplished with haste; but that the committee recognized the importance of constant effort in carrying on the work, which, so far, has been mostly in the direction of organization. The idea has been to create a sentiment in favor of the monument before making a concerted effort to collect funds for the purpose in mind. A number of the State pharmaceutical associations have already begun to coöperate in the work, and it is hoped that by another year all of the State associations, as also other similar organizations, will be enlisted in the movement. John F. Hancock, chairman of the committee, said, in addition, that an effort was being made to acquaint the younger pharmacists with the work of Procter, and that the results were encouraging. He said that it would be a grand thing when the archives of the Association are treasured in the Smithsonian Institution, and when a monument to the Father of American Pharmacy is erected on the grounds of the Institution.

A resolution having for its object improvement in the customs inspection of drugs brought into this country was referred to both the Committee on Publicity and the Committee on Legislation.

A recommendation to the effect that the colleges of pharmacy belonging to the Conference of Pharmaceutical Faculties be authorized to organize as local branches of the Association, and that they report on the status of pharmacy in their respective localities, was adopted.

The Committee on Weig[illegible] and Measures presented a report in which attention was directed to the difficulty arising from the fact that there are no other divisions of the liter than the milliliter. A recommendation was made [illegible]pt subdivisions of the liter. The report and recommendation were referred to the Scientific Section.

A report on the status of pharmacists in the Government employ was read by Geo. F. Payne, which was to the effect that the army had been slow to recognize the necessity of employing pharmacists in this department.

The place selected for holding the next meeting is Indianapolis, and the time fixed upon is the first Monday in September, 1906.

F. Y.

HENRY NORMAN RITTENHOUSE,
1831-1905.

THE AMERICAN JOURNAL OF PHARMACY

NOVEMBER, 1905.

THE DETECTION OF FORMALDEHYDE IN WITCH HAZEL.

By W. A. Puckner, Chicago.

"Witch-hazel extract," long used as a household remedy, has been admitted to the eighth decennial revision of the United States Pharmacopœia under the title Aqua Hamamelidis or Hamamelis Water. For the detection of formaldehyde in this preparation the following test is prescribed: If 1 c.c. of hamamelis water be added to 5 c.c. sulphuric acid containing a little salicylic acid in solution, no red color should appear (absence of formaldehyde).

While the reliability and sensitiveness of the many formaldehyde tests have been critically reviewed,[1] the above test does not seem to have been considered. Since witch hazel promises to be a favored subject for investigation by dairy commissioners and similar bodies entrusted with the enforcement of pure food and drug laws, the following experiments are of interest:

Dilutions of formaldehyde were prepared (*a*) containing 1 gramme of absolute formaldehyde in 1,000 c.c. of water; (*b*) containing 1 gramme formaldehyde in 1,000 c.c. of a liquid obtained by mixing 15 volumes of official alcohol and 85 volumes of water; (*c*) containing 1 gramme formaldehyde in 10,000 c.c. water; (*d*) containing 1 gramme formaldehyde in 10,000 c.c. of 15 per cent. alcohol; (*e*) 1 gramme in 100,000 c.c. water; (*f*) 1 gramme formaldehyde in 100,000 c.c. 15 per cent. alcohol.

(1) One gramme salicylic acid was dissolved in 100 c.c. sulphuric acid, sp. gr. $1 \cdot 8341 \frac{25°}{25°}$. Portions of 5 c.c. of the reagent were measured into dry tubes and 1 c.c. each of the formaldehyde dilutions just described added, mixed with the

[1] B. M. Pilhashy, *Jour. Am. Chem. Soc.*, 1890, 22, 132. C. H. LaWall, *Am. Drug.*, 1905, 47, 33. U. S. Dept. Agriculture, Division of Chemistry, Bull. 90, 45.

reagent by rotation and the color observed after five minutes. In no case was a red coloration observed. When a 1 per cent. formaldehyde solution was tested a decided red color developed.

(2) The reagent was prepared by dissolving 0·1 gramme salicylic acid in 100 c.c. sulphuric acid. The formaldehyde dilutions were tested as in 1, with these results:

(*a*) 1 in 1,000 water. Deep red color.
(*b*) 1 in 1,000 15 per cent. alcohol. Deep red color.
(*c*) 1 in 10,000 water. Rose color, much lighter than *a*.
(*d*) 1 in 10,000 15 per cent. alcohol. Distinct rose color, much less than *c*.
(*e*) and (*f*) No red coloration.

(3) The reagent was prepared by dissolving 0·01 gramme salicylic acid in 100 c.c. sulphuric acid. The formaldehyde dilution tested as in 1 showed:

(*a*) 1 in 1,000 water. Color was deep red, somewhat less intense than 2 *a*.
(*b*) 1 in 1,000 15 per cent. alcohol. Color deep red, less intense than 3 *a*.
(*c*) 1 in 10,000 water. Color rose red, deeper than 2 *c* and nearly equal to 3 *b*.
(*d*) 1 in 10,000 15 per cent. alcohol. Color more pronounced than 2 *c*.
(*e*) and (*f*) No red coloration.

(4) When the reagent was prepared by dissolving 0·001 gramme salicylic acid in 100 cc. sulphuric acid, very faint traces of reddish color developed with solutions *a* and *c* only.

(5) The reagent was prepared by dissolving 0·01 gramme salicylic acid in 100 c.c. of a weaker sulphuric acid, having a specific gravity of 1·8090 at 25/25 degrees. Tested as before, after five minutes the colors were:

(*a*) 1 in 1,000 water. Red color distinct, but much less intense than 3 *a*.
(*b*) 1 in 1,000 15 per cent. alcohol Red color, less intense than 3 *a*.
(*c*) 1 in 10,000 water. Red color, less intense than 5 *b*.
(*d*) 1 in 10,000 15 per cent. alcohol. Red tinge hardly perceptible.

At the end of an hour these colors all became more intense and after several hours closely approached those obtained in 3.

(6) To portions of 5 c.c. of the reagent, prepared as at 3, was added 0·6 c.c., 0·8 c.c., 1 c.c., 1·2 c.c., 1·4 c.c.., 1·6 c.c., 1·8 c.c., 2 c.c. of the dilution *c*, containing 1 of formaldehyde in 10,000 water. The intensity of the color increased with the added quantity of formaldehyde dilution up to 1·4 c.c. and then remained constant.

The dilution *d*, containing 1 in 10,000 15 per cent. alcohol, when used in the same way gave similar results. When 0·6 c.c. was used the red was barely perceptible; the intensity then increased until 1·4 c.c. were added, and then again remained the same when still larger volumes of the formaldehyde dilution were used.

(7) The reagent prepared as at 3 and allowed to stand over night, eighteen hours, was found to be inert, *i. e.*, did not show the presence of formaldehyde in any of the dilutions used above.

These experiments show that the official formaldehyde test, when properly applied, will show the presence of 1 gm. of formaldehyde in 10,000 c.c. of a 15 per cent. alcohol.

The relative sensitiveness of the test was shown by the following experiment: A commercial specimen of witch hazel, which from the color yielded with the official test, was judged to contain about 1 part formaldehyde in 5,000 parts, was diluted with 9 times its volume of water, and a distinct, if not deep, purple coloration when applying the Leach hydrochloric acid-casein test[1] which, in my hands, has been sensitive to 1 in 100,000, was obtained.

When much salicylic acid is used the test is less sensitive: if 0·05 gramme is used for 5 c.c. sulphuric acid, then it will fail to detect 1 part formaldehyde in 1,000 c.c. Further, the reagent should be freshly prepared and the sulphuric acid should be of full strength.

It would seem desirable that the official test be changed to read: "If 1 c.c. hamamelis water be added to 5 c.c. of a freshly prepared solution of 0·01 gramme salicylic acid in 100 c.c. sulphuric acid, no red color should appear on standing (absence of formaldehyde)."

PRELIMINARY REVIEW OF THE CHEMISTRY OF THE U.S.P., VIII.

By Carl G. Hinrichs, Ph.C.,
Professor of Chemistry, St. Louis Dental College.

The long-expected has happened—the Pharmacopœia is out. The many warnings sent to the journals of its expected arrival have kept the druggists on the lookout. Still, doctors of a certain stripe will cheerfully go along the old way of prescribing ready-made preparations, while the true physician will take heed of the changes that vitally concern him and his patients. The chemist turns to the chemicals, looks at the fine print and incidentally at the heralded modern features. The secretary of the commission already desires criticism, even at this early date! The editor of the A. J. P. is satisfied with a review of the new Eighth Decennial Revision of the United States Pharmacopœia. I shall try to please both, and especially the latter.

But, first, may we not commend the committee for its extreme modesty? Five years have they labored; 1900 is already a recol-

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[1] Bulletin No. 65, U. S. Dept. Agriculture, Dept. Chemistry, p. 108(b).

lection of the dim past; but the Eighth Decennial Revision can fit in any year very nicely. Five years the commission has waited to bring forth the work; could they not have waited five months from publication to make the work official? Germany's Pharmacopœial Commission was called together in January; in June the work was published; the following January it became obligatory. But Germany has a moderate-sized work; it is kept abreast of the times; it makes its appearance every five years.

The reason for this delay cannot be justly charged to the large amount of work done by the commission, as the book fails to reveal it. The system of general voting on every dot and every I by the whole committee has taken up the time. I cannot see the reason for the pharmacists passing on the chemical data, nor why they, whose profession is materia medica, should lose sleep over the smears of the druggists. The commission had excellent men representing every branch of pharmacy; why could they not have followed the modern method of division of labor. Imagine some of the druggists worrying over that ancient theory of artiads and perissads when the question of $FeCl_3$ or Fe_2Cl_6 was gravely discussed; 'tis sad! It is my belief that the work would have been better and more prompt in its appearance, if a plan, as intimated above, had been followed.

As to changes in nomenclature, the committee was conservative; they believe in *one* English language. In this we should commend them. We have tried to learn the mother tongue; to be compelled to do this work over again would cause much worry. How this so-called American-English can be a matter of discussion, after the flaying it has received in the *Chemical News* about a decade ago, I fail to see. One English language is enough for us.

In the preface p. xl it says: "The dropping of the final e for the alkaloids and the halogens was not approved for the reason that its use has become a thoroughly established custom in this country, and it was *not deemed wise or safe* to sacrifice this distinctive method of designating powerful substances used as medicine." With this excellent premise, we ask, was it *wise or safe* to even change the "unchangeable" Latin titles. The "use has become thoroughly established" to call arsenous acid acidum arsenosum; indeed, it varies little from this in other pharmacopœias, -icosum and -iosum, in French it is given in the vernacular. This poison will probably

never change its name in the vernacular. Is arsenic trioxide "thoroughly established" in chemistry? We say no; it is a theoretical name. That it contains arsenic and oxygen none will doubt; that these are present in a certain definite proportion is unquestioned, but the formula is to-day in question; new German works are prone to call this arsenic hexoxide, next revision may be modern, and want the term arseni hexoxidum. The danger that may arise from too many theorists composing a *practical* work cannot be better shown than by the above.

Changing of names is a curse; not only is chemistry blessed with this curse, but other sciences also. Botany is in a bad way. Botanists have ruled unanimously to go back to the oldest name; a tacit acknowledgment by these scientists that they do not recognize manufacture of names for named things as botanical expertness, or a grand advancement in botany. The botanists do not look upon this with favor, as the great herbaria and museums have directors whose clerks are expert clerks as a rule, and they can do the heavy scientific work of bringing forth new names, you can imagine the chaos the science already was fast approaching.

In chemistry we speak of carbon dioxide to-day; its predecessor was carbonic anhydride and carbonic acid anhydride; even before this it was known as carbonic acid. While these anhydride terms have passed into innocuous desuetude, the older term, carbonic acid, thrives in common life. To give a named substance a new name every time a little additional insignificant new fact has been noted, is not sane practice. This habit can never be endorsed by those who follow. Even to-day it is sufficiently difficult to read books of Liebig's time. Probably these word-changers have never seen a work antedating their youth, nor had occasion to look up the prior art of a chemical manufacture, or, if they should try to read up in an old book and not understand the language, they would say, "Oh, that is antiquated."

The committee has followed in the wake of the British, Germans and French in introducing synthetics. While at the time when the other pharmacopœias admitted these products, it might have been considered a questionable procedure, to-day it would be folly to refuse these agencies a place in the U.S.P. They have proved their value medicinally, even if they were encumbered with exorbitant prices and clinical reports "made in Germany."

An attempt has been made to convey the chemical nature of the substance in the official title. This is very good so far as it goes; still, catchy and euphonious titles can not as a rule result therefrom. It seems the patentees have carefully considered the name for their products; the extensive advertising has made these names familiar. The phenacetinum of other pharmacopœias finds itself replaced by acetphenetidinum in the U.S.P. Where in the Pharmacopœia will we find the synonym phenacetin? It is going a trifle too far to ignore this name in the work, even if the Farbenfabriken have a trade-mark on phenacetin in the United States. This cannot prevent people from using that term; the B.P. gets around such nice points by saying, under the title Phenazonum, as foot-note: "Phenazone is commonly known as antipyrine." Probably the many prosecutions under the name phenacetin has made the term unpopular in the United States. The exorbitant prices on these products and the unjustness of our patent laws in this regard, causing the druggist to be easily roped in, makes it a good policy to admit such drugs to the U.S.P. as soon as possible. This will prevent substitutions practiced on the druggist, for the U.S.P. contains the tests whereby he can identify the product. This will also protect the patient from inferior drugs, our most important duty.

From old Roger Bacon till to-day is a long cry; his spirit has just been made official. Acetone is an excellent solvent for organic as well as inorganic compounds, especially mercuric salts. It is a good addition to the U.S.P.

CHEMICAL FORMULÆ.

A few substances of the 1890 Pharmacopœia have suddenly found their weight reduced by half. Such are the ferric series, calomel series of salts, etc. Cerii oxalas is even bereft of its formula, this blunder of the former commission being remedied. I am pleased to see that formulation effusions of certain quasi chemists have not been admitted. I refer to the periodical attempt of some pharmacists to formulate the scale compounds. Some claim they cannot think chemically unless the substance is formulated. I have seen them place the chemical formula on bottles of crude salts; wonderful erudition.

The innovation in the U.S.P., VIII, is the introduction of structural formulæ in the definition. The chemicals of the U.S.P. are in all

cases far from C.P., to give their composition by molecular formulæ is sufficient, to attempt their structuralization is going a step beyond safe and sound reason. These formulæ are of interest to theoretical and working chemists; the molecular formula tells all that is required by the analytical chemist. The druggist of to-day is not even the latter, much less a theoretical chemist; hence this innovation is hardly called for.

Such formulæ may have their proper place in the great reference work of the druggist, the U. S. Dispensatory; they are matters for a reference work, and not the working guide. The German Arzneibuch has not a single chemical formula from the front cover to the back. The B.P. has one or two, but these are of the complex aromatics used as reagents. The Codex contains both the molecular and equivalent formulæ. As all volumetric assays are really based on the latter, their admission is correct.

The many complex bodies, the alkaloids, etc., have not been in all cases sufficiently studied to enable chemists to give their structure. This has led the commission to make the queer break of formulating alkaloidal salts, the acid structural, the alkaloid molecular. This is not in accordance with good chemical usage. Again, setting out the methyl group in codeine can but bewilder. Probably it feels its queer position!

GASOMETRIC ANALYSIS.

The commission has made the same blunders as its predecessor on this most elegant, rapid and exact method of analysis. The gas burette, nitrometer, used, is not the best, cheapest or most practical style for the druggist or chemist.

One table of corrections has been added. It is pleasing to see some advance made over the 1890,which implied barometric pressure has no noticeable effect on the gas volume. The U.S.P.,VIII, says that pressure has some effect, but only when "the locality is more than 250 metres above sea level." The revisors have forgotten that all the estimations take place in the presence of water, and that the gas, as a result, is saturated therewith. At 15° the vapor tension of this watery vapor amounts to only 12·7 mm.; at 25° to 23·6 mm., and at 30° to *only* 31·6 mm., which amounts must be subtracted from the observed barometric pressure to give the *true gas pressure.* When we have this correct pressure we may proceed to apply the

table of the U.S.P., VIII. In other words, we have here the rich idea of some one to apply a correction to a method of analysis and still remain incorrect to the extent of from 1·5 to 3 per cent., and even more in summer. If it take five years to make a fake correction, how long will it take to complete it? Have your chemical subdivision, and do not let non-workers pass on technical questions of which they know little and understand less.

Let us consider that 250-metre absurdity. You will have to go rather high to touch this *low mark* in the city of New York. Observations as recorded by Professor Cole show that the mean barometric readings for a number of years in New York are 29·854 inches, practically 760 mm., equal no correction U.S.P., VIII. He has found that the hourly variations in pressure, if plotted for the year, follow the curve of probability, proving this barometric change follows the law of probability. In other words, he is able to calculate the number of times a certain reading will be made during the year. To avoid the negative sign, the deviations from 28·00 inches are given, I take only the ¼-inch differences to avoid too long a table. This is taken from the *Meteorologische Zeitschrift*, 1894, in our library:

Deviation	0·95	1·25	1·50	1·75	2·00	2·25	2·50
Times read	0	5	31	79	64	18	2

This table then demands that a pressure of 28·75 occur 79 times during a year. Let us take the readings of a single year as observed, 1890:

Reading	0·95	1·25	1·50	1·75	2·00	2·25	2·50
Observed	1	6	25	79	62	14	2

From the above, you will see that 760 mm. is not the prevalent thing even at sea level; in the West the changes are greater and more sudden. This variation from 28·95 to 30·50 inches in New York, means on 30 inches a variation of 5·1 per cent. Shall a small 5 per cent. be overlooked in our assays? But the overlooked or unheard-of vapor tension makes another inch at 25°, and this must always be subtracted from the barometric reading, one on thirty is another little 3⅓ per cent. Fine 8 per cent. was what the U.S.P. of 1890 allowed us to run on, and the grand U.S.P., VIII, allows New Yorkers the same. How considerate to our druggist in the metropolis. Did he have a "pull"?

Let us see the number of times the New Yorker gets a true result of analysis. The mean pressure is 29·854 (29·92 is 760 mm. or no correction), plus one inch is 30·854. So when the barometer stands at 30·854, vapor tension is compensated, and as you are not above 250 metres, you must ignore the barometer! Please take note of the fact that the highest reading for New York observed is 30·60, and that during the entire year 30·50 occurs only *twice*. Therefore, brother pharmacists, you will always have wrong results in the assay of spirits of nitre; your assays will always be *high*, from a per cent. to 8 per cent. *only*. One consolation to you, we are worse off in St. Louis, even the cyclone blew us way below any reading you may have in New York. For further details on this method of analysis, see "Hinrichs' General Chemistry," pages 228–231.

ATOMIC WEIGHT.

These are probably the most important data in chemistry; naturally they are then subject of côntinual research. It will be remembered that this research gave us a number of new elements of the argon variety. Lord Raleigh, in comparing the density of chemical nitrogen and that supposed to be purest nitrogen obtained from the air, found the latter to be relatively heavier than the former. When you consider the thoroughness wherewith nitrogen from air has been studied during the past century, may we not ask the question: Has hydrogen been more thoroughly studied than nitrogen? Hydrogen being the lightest of all known gases, how will impurity affect its atomic weight? There is only one answer possible, and that is, it will make the atomic weight higher. As a matter of fact, the results seem to tend in all instances in that direction. In physical standards the material taken should be above suspicion. It is very unfortunate that the committee has adopted this hydrogen standard, especially as the International Atomic Weight Commission has this year dropped this foolishness for good. See *Bulletin Société Chimique de Paris* for January, 1905.

In the future only one table of atomic weights will be published, namely, that referred to oxygen equal 16·000. This has been used by the men who practiced for years; bodies such as the Hungarian Association for the Advancement of Science have long discarded the silly hydrogen didactic twaddle. Practical German pharmacists, such as Fischer of Breslau, have used these same weights in their

many publications of practical value. It seems this set of U.S.P. weights had its inception from the Government chemist, Prof. F. W. Clarke. (See preface, p. xlvi.) Did he dupe the committee, or did the silly didactic nonsense appeal to the didactic druggists on the commission? Again, we must say that the chemists should not be hampered by others on the commission. Those who read only drug journals or the A. Ph. A. year-book cannot be said to be posted on current chemical literature.

In 1900 and 1901 there appeared a series of articles bearing on this subject in the *National Druggist*, that brought out a letter from the professor just mentioned. In this letter the Government chemist desires the committee to remember that, of 143 chemical teachers in German universities, 118 favored the hydrogen standard, 20 favored the oxygen standard, and 5 were indifferent. From the above, we see who was the nigger in the wood-pile. Four years only have elapsed since the said effusion. To-day the International Commission desires the oxygen standard only. They dropped hydrogen for the future. Why? Because a little understanding is gradually percolating into their respective heads. It may also be noted that the very prominent chemist, M. Guye, has lately proved the Stas value for nitrogen false, though declared by Stas as correct and sworn to by Prof. F. W. Clarke, for he is a great Stasian. When the foundation stones of the Government atomic weights are proven false, those based thereon are false; but, worst of all, analyses in which such values are used are also far from the truth. Of course, when this is brought out in criminal proceedings in the courts, judges will take note of the facts, and rule against the U.S.P. weights. I have found the dicta of official chemists are not blindly followed by the wideawake jurists in American courts.

I may be pardoned for expressing some satisfaction over the turn that has occurred during the past few years on atomic weights, especially as the first questioning of the Stasian system some fifteen years ago in the Academy of Sciences of Paris by my father has borne fruit. It then almost amounted to sacrilege to question the work of Stas. To-day it is gradually being admitted that there was a great deal of humbug in the work of this scientist. Will the United States Government chemists blindly follow the old lead, when all the world refuses to be further duped? We know not, but this is certain, independent chemists care little for Government work in this country; reason will prevail.

OFFICIAL DEFINITION.

This important feature of the U.S.P. is a vast improvement over the preceding edition—for chemicals at least. The 1890 said: "Sodium nitrate should be kept in well-stoppered bottles." The U.S.P., VIII, says: "It should contain not less than 99 per cent. of pure sodium nitrate (NO_2ONa), and should be kept in well-stoppered bottles." That old bottle of the 1890 was truly a queer vagary; at first sight that was the all-important thing for the druggist. The fine print was an incidental, thrown in for good measure and not important. Maybe this feature has had something to do with the apathy of the druggist to test his products. What is worth printing in a work of this kind is worth printing in such a manner as to be easily legible.

A very peculiar feature of the new edition is, it demands a strength which chemicals shall attain, but nowhere in the text can the method of verification be found. This is not noted in the above case only, but generally. In this instance there is not even an *implied* method of assay, as there is under sodii boras. Under the latter, deportment towards heat, it is stated: "At red heat the salt fuses to a glass and loses 47 per cent. in weight." There are too many of such instances in the U.S.P., VIII. In some cases the implied assay, for example under alumen, cannot be said to be in any way approaching accuracy.

The worst feature of the *implied assay* is that all the data given presuppose a strength of 100 per cent. They are based on the chemical formula and the "official" atomic weights. If the definition is correct the fine print data are wrong. If the fine print is correct, the definition is incorrect. The AMER. JOUR. PHARM. readers may choose either proposition.

The descriptions, as a rule, are to the point. Here and there an incorrect use of terms is made, however. For example, under potassium permanganate we are informed of a *blue metallic lustre.* This is the first time I learn that lustre has color.

Solubilities are given now at 25°. This makes a difference, as a rule, from the 1890 data of about 5 per cent. on amount dissolved.

The fusing and boiling points are similar to the old work. Of what use to the druggist is it to find that sodium nitrate fuses at 312° C.? Certainly he cannot verify this with any degree of satisfaction. The data of a pharmacopœia should be such as to admit of easy

confirmation and be of practical value. The above is neither. Under other salts we find temperatures given at which fusion takes place up to 700°. Certainly such data belong to a text book or reference book, such as the U.S.D., and not to a pharmacopœia.

The tests for purity and identity are given in the verbose style of the former edition. The statements are too involved for the chemist and hardly explicit enough for the druggist. Here the commission could have well followed the *British Idea*, plain and few tests, but tests of practical value. Lastly, the official tests as made could have been grouped together in the back of the book (see the B.P.). Is not the overwhelming appearance of the fine print frightening the average druggist from attempting a chemical test? If he knew the simplicity of the practice he would not be so apathetic. In a second paper I shall take up the testing of the Pharmacopœia in detail, touching on the directions for manipulation, tests of faulty nature and some important data that have been omitted.

THE TABLES.

First Atomic Weights Table. It appears an attempt is made to throw dust. The "International" for 1904 gave both H equal 1·000 and O equal 16·000. In 1905 both were given, but no hydrogen standard will be issued in 1906. So the U.S.P. will stand for years to come as a relic of the past.

Thermometric tables are as usual. I should be very much pleased to see a thermometer that can bite the ten thousandth of a degree. These tables could have been very much contracted if they had been made practical. There is no use going beyond that which can be detected with certainty. Chemists are happy if they get the tenth of a degree with certainty.

The specific gravity tables are sensible. The idea of taking specific gravity at 15° and referring that to water of 4° was very pharmaceutical, to say nothing of reducing the results to vacuo. The U.S.P., VIII, has the gravity taken at 25°, we compare this with the weight of an equal bulk of water at the same temperature. This temperature corresponds more closely to our condition of living than does the old 15° of the Europeans. The normality introduced will prove practical for the determination of the strength of weak solutions of acids and alkalies, not, however, for the higher strengths above 10 per cent.

Of measures, may say the same as under thermometric equivalents. They were formed by dividing till tired. Where can I find a minim measure showing the ten thousandth of a minim?

A CRITICAL REVIEW OF THE INORGANIC CHEMISTRY OF THE NEW UNITED STATES PHARMACOPŒIA.

By Henry W. Schimpf.

Among the newly added articles of the Pharmacopœia there are nine which belong to the class of inorganic substances. These are: Acidum hydriodicum dilutum, Acidum hypophosphorosum, Kaolinum, Mangani hypophosphis, Sodii arsenas exsiccatus, Sodii carbonas monohydratus, Sodii phosphas exsiccatus, Talcum and Talcum purificatum. Besides these there are seven metallic salts of organic acids: Ammonii salicylas, Bismuthi subgallas, Bismuthi subsalicylas, Sodii citras, Strontii salicylas, Zinci phenolsulphonas and Zinci stearas. Also the following preparations containing principally inorganic substances: Cataplasma kaolini, Liq. sodii phosphatis compositus, Magnesii sulphas effervescens, Sodii phosphas effervescens, Unguentum acidi borici, Unguentum hydrargyri dilutum, and Unguentum zinci stearatis.

Acidum Hydriodicum Dilutum, Diluted Hydriodic Acid (HI).—"A solution containing not less than 10 per cent. by weight of the absolute acid and about 90 per cent. of water." This preparation was official in the U S.P., 1860, but was dismissed because of its unstable nature and the consequent difficulty experienced in preserving it. It decomposed readily on exposure, liberating iodine. In the present preparation the introduction of about 1 per cent. of potassium hypophosphite produces sufficient hypophosphorous acid to act as a preservative; this it does by reducing any iodine set free to hydriodic acid. The acid should be kept in small amber-colored glass-stoppered bottles. The method of preparing it is the same as that recommended in the U.S.P., 1890, for Syrupus acidi hydriodici. The syrup is still official, but it is prepared from the dilute acid by the addition of syrup and water.

The preparation of the acid depends upon the reaction of potassium iodide in concentrated aqueous solution with a solution of tartaric acid in diluted alcohol. The mixed solutions are placed in

a bath of ice-water for several hours and then strained through cotton to separate the crystalline precipitate of potassium bitartrate. The reaction may be explained by the equation $KI + H_2C_4H_4O_6 = HI + KHC_4H_4O_6$. The use of alcohol and of the ice bath are to facilitate the separation of the potassium bitartrate.

In the Pharmacopœia of 1860, diluted hydriodic acid was made by passing hydrogen sulphide gas through iodine suspended in water. $2I_2 + H_2O + 2H_2S = 4HI + H_2O + S_2$. The product was a purer one than that of the present Pharmacopœia, but the use of sulphuretted hydrogen, because of its offensive odor, was decidedly objectionable.

The Pharmacopœia describes tests for the following impurities: Sulphuric acid, barium, non-volatile residue, heavy metals, by the "Time-limit Test;" and arsenic by "Modified Gutzeit's Test." To these might have been added tests for free iodine and tartrate.

The assay method recommended for the diluted acid, as well as for the syrup, is that employing Volhard's solution, as in the case of Syrupus ferri iodidi, in the 1890 U.S.P. This is an improvement over the former method for Syrupus acidi hydriodici, in which direct titration with decinormal silver nitrate v. s. was employed, and potassium chromate as the indicator.

Acidum Hypophosphorosum, Hypophosphorous Acid (HPH_2O_2).—Acidum hypophosphorosum and Acidum hypophosphorosum dilutum are both official, the former being newly added. It is "a liquid composed of 30 per cent. by weight of absolute hypophosphorous acid, $POH_2(OH)$, and 70 per cent. of water."

No method for the preparation of this acid is official, though the National Formulary gives a method for preparing the diluted acid. This may be concentrated by evaporation, but if heated to 130°—140° C., it decomposes, forming the spontaneously combustible hydrogen phosphide and other compounds. Hypophosphorous acid is a powerful reducing agent, reducing silver nitrate to metallic silver, mercuric chloride to mercurous chloride and finally to metallic mercury. It also precipitates yellow copper hydride when heated with copper sulphate.

Tests for the detection of the following possible impurities are described: Phosphoric, phosphorous, sulphuric, oxalic and tartaric acids, and potassium, the tests being the same as those described for the diluted acid in the 1890 U.S.P. A test for barium is given,

whereas in the former U.S.P. a test for calcium was described. An innovation is the "Time-limit Test for Heavy Metals," which takes the place of the specific tests for lead and for iron of the U.S.P. of 1890. Arsenic is detected by the "Modified Gutzeit's Test."

The assay consists of a simple neutralization, using normal potassium hydroxide v. s. in the presence of methyl orange as indicator; phenolphthalein was formerly used as indicator. The permanganate method for assaying this acid, described in the U.S.P. of 1890, has been dismissed as unnecessary. Acidum hypophosphorosum dilutum is made from the stronger acid by dilution. The stronger acid is the more stable, hence its introduction is to be regarded as a wise step.

Ammonii Salicylas, Ammonium Salicylate ($NH_4C_7H_5O_3$).—This salt is so little used that its introduction to the U.S.P. seems an unnecessary one.

Bismuthi Subgallas, Bismuth Subgallate.—"Bismuth subgallate should yield not less than 52 per cent. nor more than 57 per cent. of pure bismuth oxide" (Bi_2O_3). This salt is of somewhat variable chemical composition and therefore no chemical formula for it is given in the Pharmacopœia. It is approximately $Bi(OH)_2C_7H_5O_5$. The wisdom of the introduction of this salt must be apparent to all. It has been widely used for a long time under the trade name of dermatol and has been found a highly valuable remedy both for external and for internal use. It is official in the German Pharmacopœia. Satisfactory physical and chemical tests for identity are given in the U.S.P. as well as descriptions of tests for impurities, free gallic acid, nitrate, and arsenic.

The gravimetric process for its assay consists in thoroughly igniting 1 gramme of the bismuth subgallate in a porcelain crucible; it at first loses water, then chars, and finally leaves a yellowish residue; this, when cool, is treated with 5 c.c. of nitric acid, added drop by drop and warming until complete solution is effected, the resulting solution of nitrate is evaporated to dryness, the residue converted by ignition into bismuth oxide; this should weigh not less than 0·52 gramme nor more than 0·57 gramme.

Bismuthi Subsalicylas, Bismuth Subsalicylate.—This "should yield not less than 62 nor more than 64 per cent. of bismuth oxide." It is assayed in exactly the same manner as the foregoing. It is also official in the German Pharmacopœia. The tests for identity are the

standard ones and are easily carried out. Its chemical composition is variable but is approximately $BiOC_7H_5O_3$. It is also official in the Swiss and in the British Pharmacopœias.

Kaolinum, Kaolin.—"A native aluminum silicate consisting chiefly of the pure silicate ($H_2Al_2Si_2O_9 + H_2O$) powdered and freed from gritty particles by elutriation." It is official in the British Pharmacopœia under the same name, while Bolus alba is official in the German Pharmacopœia. Kaolin is a very pure clay. It was introduced into the Pharmacopœia because it enters into the preparation of cataplasma kaolini, but its use outside of this is very extensive, being used as a dusting powder, and combined with antiseptics as an application to wounds; it is also employed as an excipient in making pills of silver salts and of potassium permanganate. It does not decompose these substances as most of the organic excipients do.

Cataplasma Kaolini, Cataplasm of Kaolin.—This is similar to certain proprietary clay preparations. It is undoubtedly a very useful preparation and not an entirely novel one, for the peasants of Central Europe have long employed a mixture of clay and glycerin as a household remedy for many ailments, especially where poultices were indicated.

The U.S.P. preparation consists of kaolin, 577 grammes; boric acid, 45 grammes; glycerin, 375 grammes, together with thymol methyl salicylate and oil of peppermint.

Liquor Sodii Phosphatis Compositus, Compound Solution of Sodium Phosphate.—This compound is prepared by triturating sodium phosphate and sodium nitrate in a mortar with citric acid until complete liquefaction has taken place, then adding sufficient water to make a product of which 1 c.c. contains 1 gramme of sodium phosphate. This solution should be kept well stoppered and in a moderately warm place. The tests for identity are the standard tests for phosphate, nitrate and citric acid. A preparation similar to this has been in commerce for some time.

Magnesii Sulphas Effervescens (Effervescent Magnesium Sulphate).—This preparation may be used instead of the magnesii citras effervescens of the 1890 Pharmacopœia, which has been dismissed. A similar compound is official in the British Pharmacopœia. This preparation is more stable than the effervescent citrate of magnesia.

Mangani Hypophosphis (Manganese Hypophosphite, $Mn(PH_2O_2)_2 + H_2O$).—"It should contain not less than 97 per cent. of pure

manganese hypophosphite $(PH_2O_2)_2Mn + H_2O$." This salt enters into the preparation of syrupus hypophosphitum compositus. It is a pink crystalline powder, very soluble in water though not so in alcohol. Tests for the detection of carbonate, phosphate, calcium and arsenic are described.

Sodii Arsenas Exsiccatus, Exsiccated Sodium Arsenate (Na_2HAsO_4).—"It should contain not less than 98 per cent of pure anhydrous di-sodium-ortho-arsenate ($AsO(OH)ONa_2$)." It is an amorphous white powder, odorless and permanent in dry air. It is made from sodii arsenas ($Na_2HAsO_4 + 7H_2O$), which is also official, and which it is certainly a mistake to have retained. The latter contains over 40 per cent. of water, and is therofore nearly one-half the strength of the exsiccated salt. Confusion, mistakes and danger are liable to occur. That the exsiccated salt, which is more stable, should be made official is commendable, but it is an evident mistake to retain the other salt. The only excuse it has for being official is that the exsiccated salt is made from it, but then the directions for making the exsiccated salt might better have been omitted. The hydrous sodium arsenate was official also in the U.S.P., 1880, under the name of sodii arsenias, and a process for its manufacture given. It is efflorescent in dry air, and deliquescent in moist air. Therefore, unless the salt was perfectly fresh the percentage of arsenic was uncertain. Hence the introduction of the new anhydrous salt, which is more stable, and therefore of more certain composition, is a great advantage. It enters into liquor sodii arsenatis.

The Pharmacopœia describes four tests for identity; one test for presence of arsenite as an impurity, and one for the detection of lead, copper and iron by the use of ammonium sulphide T.S.

Sodii Carbonas Monohydratus, Monohydrated Sodium Carbonate ($Na_2CO_3 + H_2O$).—"It should contain not less than 85 per cent. of pure anhydrous sodium carbonate $CO(ONa)_2$, corresponding to not less than 99·5 per cent. of the crystallized monohydrated salt." This salt is introduced with the object of furnishing a sodium carbonate of uniform strength and of stable character. Sodii carbonas and sodii carbonas exsiccatus, U.S.P., 1890, have been dismissed. Sodii carbonas was a very efflorescent salt; it contained 10 molecules of water of crystallization, which amounts to about 63 per cent. of its weight. Upon exposure to air much of this is lost, so that the salt is of uncertain strength. Sodii carbonas exsiccatus

retained 2 molecules of water of crystallization, or about 26 per cent., and is very hygroscopic, and therefore like the crystalline salt of uncertain and varying strength. Thus the introduction of sodii carbonas monohydratus furnishes a salt the composition of which is definite, and, being only very slightly efflorescent and hygroscopic, it may be depended upon as being more uniform than the two carbonates of sodium formerly official.

The U.S.P. gives three tests for identity, namely, the alkalinity test with litmus, the effervescence test, and the sodium-flame test. Impurities are detected by the time-limit test for heavy metals. It is titrated with half-normal sulphuric acid v.s., using methyl orange as indicator.

The 1890 Pharmacopœia gave tests for the following impurities: Insoluble matter, sulphocyanate, calcium, potassium, chloride, sulphate, sulphite hyposulphites, ammonia, arsenic, lead and aluminum and iron, the four latter by the hydrogen sulphide test. It is astonishing that none of these impurities are directed to be sought in the new official salt, especially sulphate, chloride and calcium. The time-limit test may detect arsenic, lead and iron, however. The Pharmacopœia requires 99·5 per cent purity for the salt by volumetric analysis.

Sodii Citras, Sodium Citrate ($2Na_3C_6H_5O_7 + 11H_2O$).—"It should contain not less than 97 per cent. of pure sodium citrate ($2C_3H_4(OH)(COONa)_3 + 11H_2O$) and should be kept in well-stoppered bottles." It is slowly efflorescent, but not as deliquescent as potassium citrate. It is assayed by neutralization after ignition in the same manner as other organic salts of the alkalies.

Sodii Phosphas Effervescens, Effervescent Sodium Phosphate.—An effervescent sodium phosphate has long been in use, and a similar preparation is official in the British Pharmacopœia.

Sodii Phosphas Exsiccatus, Exsiccated Sodium Phosphate (Na_2HPO_4).—"It should contain not less than 99 per cent. of pure anhydrous sodium phosphate ($PO(OH)(ONa)_2$) and should be kept in well-stoppered bottles." This is a very deliquescent salt. The crystallized sodium phosphate ($Na_2HPO_4 + 12H_{20}$) contains 60 3 per cent. of water; 355·61 parts contain 214·56 parts of water. The same quantity of the exsiccated salt contains no water, therefore 141·05 parts of the exsiccated salt are equal in strength to 355·61 parts of the crystallized salts, which means it is about 2½ times as strong.

Although the Pharmacopœia directs that the salt should contain not less than 99 per cent of the pure salt, it gives no assay method. It enters into the preparation of the effervescent sodium phosphate.

Strontii Salicylas, Strontium Salicylate ($Sr(C_7H_5O_3)_2 + 2H_2O$).—It should be not less than 98·5 per cent. purity. It is soluble in 18 parts of water and in 66 parts of alcohol. In the U.S.P. of 1890 strontium bromide, iodide and lactate were official, in the present revision the lactate has been dropped, and the salicylate (a much better preparation) has been introduced.

The Pharmacopœia describes eight tests for identity, and for the detection of impurities recommends the time-limit test and a test for barium. The assay is a gravimetric one, depending upon the conversion of the salt into strontium sulphate. It may also be assayed volumetrically by neutralization after ignition.

Talcum and *Talcum Purificatum* are both official. The former is native hydrous magnesium silicate, in powder or masses. It is also official in the German Pharmacopœia. Talcum purificatum is to be found in the National Formulary, and is used as an aid in filtering turbid liquids containing finely divided matters in suspension which are apt to pass through the filter or to stop up its pores. It is used in the U.S.P. method of preparing official waters of volatile oils, in the same way as in previous revisions of the U.S.P. there was used magnesium carbonate, then absorbent cotton, and then precipitated calcium phosphate.

Talcum purificatum is prepared from native talcum by treatment with hydrochloric acid.

Unguentum Acidi Borici contains 10 per cent. of boric acid in a base consisting of white petrolatum with 10 per cent. of paraffin. A similar preparation is official in the German and in the British Pharmacopœias.

Unguentum Hydrargyri Dilutum, Blue Ointment, contains 67 per cent. of unguentum hydrargyri and 33 per cent. of petrolatum. Unguentum hydrargyri is as before 50 per cent., therefore the diluted ointment is 33·5 per cent. The stronger ointment is called "mercurial ointment" and the diluted preparation is known as "blue ointment."

A very useful and satisfactory assay process for unguentum hydrargyri is official. This ointment is official in the German Pharmacopœia under the name of unguentum.

Hydrargyri cinereum, lanolin being employed instead of oleate of mercury.

Unguentum Zinci Stearatis is also official, it consists of equal weights of zinc stearate and white petrolatum.

Zinci Phenolsulphonas, Zinc Phenolsulphonate ($Zn\ (C_6H_5O_4S)_2$).—This salt has long been used under the name of zinc sulphocarbolate, and is official in the British Pharmacopœia under that name. It should contain, in uneffloresced crystals, not less than 99·5 per cent. of pure zinc paraphenol sulphonate $(C_6H_4\ (OH)\ SO_3)_2\ Zn + 8H_2O$. No method for its preparation is given. The British Pharmacopœia directs it to be prepared by heating a mixture of phenol and sulphuric acid, and saturating the product with oxide of zinc, evaporating and crystallizing. This is a useful and welcome addition to the United States Pharmacopœia.

Five tests for identity are described. The impurities, arsenic, cadmium, lead and copper, are detected by means of the Time-limit Test, sulphate and chloride in the usual manner, and arsenic by the modified Gutzeit's Test.

Zinci Stearas, Zinc Stearate.—This salt contains a small but varying proportion of zinc palmitate; no chemical formula is given, and no directions for its preparation. This salt is extensively used as a dusting powder. It enters into the newly official unguentum zinci stearatis.

[*To be continued.*]

HENRY N. RITTENHOUSE.[1]

BY HELEN M. LAWRENCE.

Henry Norman Rittenhouse was born December 31, 1831, at the southeast corner of Crown and Vine Streets, Philadelphia, then a residential section of the city. He was the only child of Henry and Eliza Norman Rittenhouse, and a descendant of David Rittenhouse, the astronomer. His father was a carpenter and builder of prominence, and was identified with numerous important operations of the day, among which may be mentioned a portion of the Girard estate.

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[1] It may be of interest to our readers to know that the writer of the above sketch of Mr. Rittenhouse, Mrs. Helen M. Lawrence, is his daughter. Mr. Rittenhouse is also survived by a widow and one son, David Smith Rittenhouse, of Philadelphia.—Editor.

The early youth of the son was spent on a farm near Norristown, Montgomery County, Pa. As is generally the case with those on the farm, his opportunities for attending school were limited, but having a strong desire to learn and being possessed of an indomitable will, it is not surprising, as he grew older, he made opportunities for himself, profiting accordingly. When about twelve years of age he returned to Philadelphia and entered the employ of Homer & Colladay, a dry-goods firm, as errand boy. While still in their employ, Dr. Wynkoop, a druggist, whose store was located at Thirteenth and Lombard Streets, took him; but being anxious to see the boy advance, thought it would promote his welfare to transfer him to Edward Parrish, which was accordingly done. Later he entered the employ of Wm. Hodgson, Jr., one of the most accomplished apothecaries of our city, where he learned the drug business, and in 1851 entered the Philadelphia College of Pharmacy, graduating in 1854. From this date he carried on the retail drug business in Philadelphia until August 13, 1862, when he received his appointment as Medical Store-keeper, with the rank of Captain in the United States Army, with headquarters at Cincinnati, O., in which office he remained until his resignation in February, 1865, when he again took up the drug business, being admitted to the firm of Parrish & Mellor in June of the same year.

During the early part of the Civil War he made the acquaintance of Mr. Alfred Mellor, they both being interested in making collodion, used in the manufacture of a ball cartridge for the United States Government. After an interval of two years with Messrs. Parrish & Mellor he entered into partnership in 1867 with Mr. Alfred Mellor under the firm name of Mellor & Rittenhouse, with their laboratory at 816 Filbert Street, Philadelphia. The general business of the firm was the manufacture of pharmaceutical extracts and preparations. From their knowledge of the requirements of the trade it occurred to them that an extract of licorice made in this country might be a desirable addition to their list. The introduction of this preparation, though requiring considerable effort and time, was persevered in until finally, its success assured, other preparations were abandoned, and better quarters and machinery being required, a location was secured at 218 North Twenty-second Street, where for a number of years the manufacture of extract of licorice was the sole business. The business still increasing, the

firm was incorporated in 1886 under the name of the Mellor & Rittenhouse Company. Though the name of the company remained unchanged until recent times, Mr. Rittenhouse's retirement took place in 1890, after which he was not actively engaged in any business. His interest, however, in the affairs of the drug world never lessened, and with the subject of licorice still of the greatest possible interest to him, he conducted numerous experiments and lines of investigation looking toward the introduction of the growth of licorice root in this country, some interesting articles on the subject having appeared at various times in this JOURNAL.

While the affairs of his immediate business absorbed his time and attention, he still found opportunities during his active career to devote to other interests, public as well as personal. In 1867 he became a member of the Philadelphia Drug Exchange, and retained his membership for thirty-eight years, twenty-four years of which he was a director; vice-president in 1874–75, and president for one year, in 1881. He also served on many committees, representing the Philadelphia Drug Exchange in matters relating to their immediate interests and in affairs calling for their co-operation as a representative organization. He was also closely identified with the affairs of the Philadelphia College of Pharmacy, being elected a member December 18, 1854. He was elected a member of the Board of Trustees first on March 29, 1858, he having served the College in this capacity for a number of years at different times. He was also elected a member of the Publication Committee, March 30, 1874, having been the chairman of the committee from 1874 to 1894, and treasurer from March, 1894, to April, 1902. The long faithful service which he rendered the College as a member of the Publication Committee has been commented upon in highly complimentary terms, and a unanimous vote of thanks was extended to him for the twenty-five years of faithful work he gave the College in that important position. He was a life member of the American Pharmaceutical Association, and at the time of his death, one of its oldest members, having joined the association in 1857. During the year 1864-65, he served as recording secretary.

He was not identified with any clubs, his greatest interests being centered in his home. His society connections were few, but to him a source of pride. He was a member of Montgomery Lodge, No. 19, F. and A. M., Pennsylvania Society, Sons of the Revolution,

and The Military Order of the Loyal Legion of the United States, serving in this latter body as a member of the Board of Governors of the War Library and Museum.

In his home, the place he loved best, surrounded by his books, which were a never-ending source of pleasure, interested in all that pertained to those around him, and always ready to give good cheer and counsel to those who sought help, he passed the declining years of his useful life until, on June 24, 1905, death claimed him.

He has entered into rest—a useful life well spent. Forceful in the execution of what he believed to be right, sincere in his convictions, courageous in misfortune, happiest when deepest in his beloved work, he had a character which drew to him friendships of lifelong duration; and though at last, at the age of nearly 74 years, the mortal passed quietly away, there still remains to those who knew him the spirit of the man.

LONDON BOTANIC GARDENS.

By Pierre Élie Félix Perrédès, B.Sc., F.L.S.,
Pharmaceutical Chemist.

A Contribution from the Wellcome Research Laboratories, London.

(*Continued from p. 459.*)

The botanical history of Kew Gardens has been traced to the collections of exotic plants made by Lord Capel in his grounds at Kew, during the latter half of the seventeenth century. It was not until nearly a century later, however, that these grounds became something more than the pleasure gardens of a private mansion, containing a collection of "curious and ornamental plants" for the delectation of their owners.

For us the history of Kew begins with the installation of William Aiton as chief gardener to the Princess Augusta in 1759. With the co-operation of her scientific advisor, the Earl of Bute, this princess fostered the scientific development of Kew; and from Dr. Hill's catalogue of plants in the exotic garden of Kew, published in 1768, or nine years after Aiton's appointment, we are able to perceive that the cultivation of exotic plants at Kew had been pursued with vigor. A further development in this direction occurred in 1772, when the first collector, Francis Masson, was sent out from Kew to the Cape.

One of these early collectors, David Nelson, was assistant botanist on Cook's third voyage (1776–1779), and to him we are indebted for a collection of New Holland (Australian) plants, which contained the specimen from which the genus *Eucalyptus* was first described. In 1784 the Princess Augusta died, but her son and successor, George III, not only continued the work which his mother had begun, but he made its success assured by choosing Sir Joseph Banks as his scientific advisor in place of Lord Bute, and by entrusting to him the supervision of Kew Gardens. The collections increased rapidly, and in 1788 a house for the reception of Cape plants was erected, and another for Australian plants in 1792. The "*Hortus Kewensis*" of William Aiton was published in 1789, and in this important work accounts were given of these numerous acquisitions. It is to the influence of its collectors abroad during this period that Kew gradually came to be looked upon as the botanical headquarters of the Colonies. The collections accumulated by Sir Joseph Banks, the resources of his library, the magnificent illustrations of plants executed under his direction by the Austrian artist, Francis Bauer, and the unprecedented facilities for cultural experiment, effected, on the other hand, the transformation of Kew into a research center. After the deaths of George III and Sir Joseph Banks, in 1820, the activities of Kew suffered an eclipse until the reorganization of the institution in 1841. In that year Kew was placed in charge of a government department and became the property of the nation. Sir William Hooker was appointed director, and under his control and that of his successors in office the policy inaugurated by Sir Joseph Banks has not only been continued and developed, but the desire of the general public for a delightful pleasure-ground in the neighborhood of the metropolis has also been abundantly gratified.

The colonial expansion, nurtured during the closing years of the eighteenth century and at the beginning of the nineteenth, has been steadily developed in various ways. Botanic establishments have been founded in the various Colonies, and these have, for the most part, received their inspiration from Kew. The means by which this relationship has been brought about are briefly these: (*a*) The staffs of the Colonial establishments have been mainly recruited from Kew; (*b*) Kew, by collecting, propagating and redistributing new species and varieties of economic plants has thereby served as a connecting link between the various Colonial establishments; (*c*)

Kew has, by virtue of its advantages, accumulated an extensive herbarium and unique collections of economic products, and it possesses a staff of experts as well as a comprehensive library. We find, as a result, that the Colonial establishments have come to consider Kew in the light of a central bureau of information on matters of cultural and botanical import, and in response to this feeling a "Bulletin of Miscellaneous Information" was issued periodically from Kew during a period of thirteen years (1887–1899). But this is not all, for Kew, at the request of the Government, has from time to time directly carried out important undertakings for the especial benefit of the Colonies, such as the introduction of cinchona into India, the investigation of the coffee disease in Ceylon, and the inquiry into the economic resources of the West Indies by the former assistant director, Sir Daniel Morris, K.C.M.G., who is now Commissioner of Agriculture for Barbadoes, the Leeward and the Windward Islands.

The demand for men trained at Kew led to the adoption, in 1874, of a course of systematic instruction similar to that initiated forty-eight years previously by the Royal Horticultural Society in its gardens at Chiswick, and this training of gardeners constitutes the only direct educational work that has ever been undertaken at Kew. Indirectly, however, Kew has been instrumental in promoting the teaching of botany in other institutions, as the following examples will testify: It is to the ex-Director of Kew, Sir Joseph Hooker, that we are indebted for one of the most authoritative text-books on the flora of these islands, viz., "The Student's Flora of the British Islands." The "Primer of Botany," by the same author, has also done much to encourage the teaching of botany in elementary schools, and the same may be said of the "Elementary Lessons in Botany," from the pen of Prof. Daniel Oliver, who was formerly Keeper of the Herbarium at Kew and Professor of Botany at University College. The formation, in 1880, of a students' garden, in which students were allowed to gather specimens, was as its name implies, designed to meet the needs of the botanical student; and the supply, from time to time, of cut specimens to a number of schools and colleges has also subserved educational ends. It must be noted, however, that the work accomplished by Kew in this direction has been largely adventitious in character, and has of later years been relegated to the Chelsea Physic Garden and to the Gardens in Regent's Park, as evidenced by the suppression of the

students' garden and by the withdrawal of supplies to schools. Kew, as a matter of fact, is not of much assistance to the elementary student, except in so far as it enables him to obtain a general view of the vegetable kingdom and its products. To the student of forestry, however, the Arboretum is invaluable, and the Indian Forest students from Cooper's Hill visit the gardens weekly during the Summer months on that account.

The work of Kew in the field of research has been so extensive and so varied that it will be necessary for us to consider these activities in a general way, and to content ourselves with the selection of a few illustrative examples.

The branch of botanical research in which Kew has achieved the greatest fame is, undoubtedly, that of Systematic Botany. The *Hortus Kewensis*,[1] a work which has already been mentioned, was the most important contribution to Systematic Botany that emanated from Kew before 1841. This, however, is an inconsiderable accomplishment when compared with later monumental works, such as the *Genera Plantarum*, of Bentham and Hooker; the *Index Kewensis*, of Hooker and Jackson, and the series of Colonial floras—*e. g.* the "Flora of British India," the *Flora Capensis*, and the "Flora of Tropical Africa,"—by various members of the staff and others. These achievements have only been rendered possible by the existence, at Kew, of a great Herbarium and an extensive Library. The herbarium of Sir Joseph Banks, his scientific library, and the collection of Bauer's drawings, had all been transferred to the British Museum after his death, so that the present Herbarium and Library, on which these publications are chiefly founded, are independent creations, in which the labors of Bentham and the two Hookers have played an important part.

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[1] " . . . the 'Hortus Kewensis,' a work of three volumes, published in 1789, with the name of William Aiton, the King's gardener, on the title-page as author. It was actually the work of Daniel Carl Solander and of Jonas Dryander, in succession librarians to Banks; the original specimens from which the descriptions were drawn up are incorporated in the Banksian herbarium which is now in Cromwell Road [British Museum (Natural History)]. The second edition of this book in five volumes, nominally the product of William Townsend Aiton, son of the elder Aiton, was written partly by Jonas Dryander, who succeeded as Banks' librarian after the death of Solander, and completed by Robert Brown, who became librarian when Dryander died in 1810; the book appeared in 1810–1813."—Mr. B. D. Jackson in "Return. House of Commons." 1901, 205, p. 112.

MUSEUM I. AT KEW.

Curiously enough, it was also from Kew, the systematist's stronghold, that the movement originated which replaced the study of Systematic Botany in our universities by that of other branches of the science, such as morphology, physiology and cytology; for this result came about chiefly through the influence of the Jodrell Laboratory, completed in 1876, and of the English translation of Sachs' Text-Book of Botany, in the preparation of which the present Director of Kew assisted. Furthermore, it is of interest to record that the reaction which has become perceptible during the last few years, as well as the trend in the direction of ecological research, had its origin, not at Kew, but in the universities themselves. The work which has been accomplished in the Jodrell Laboratory is largely physiological in character, but cytological, morphological and anatomical investigations have also been actively prosecuted, as instanced by the epoch-making palæontological researches of Dr. D. H. Scott, illuminated by those of his associates, Messrs. W. C. Worsdell and L. A. Boodle, on modern plants. Among the researches that are of interest to pharmacists we may note Cross and Bevan's work on cellulose and de Wevre's investigations on Cubebs.

The first economic museum at Kew was established in 1847, when Sir William Hooker adapted the building now known as Museum No. II, for the reception of "all kinds of *Fruits* and *Seeds, Gums, Resins, Dyestuffs, Drugs, Sections of Woods* and all *curious vegetable products*, especially those that are useful in the *Arts*, in *Medicine* and in *Domestic Economy*." It is from these small beginnings that the present extensive collections, requiring three museums for their accommodation, have been developed, largely through the liberality of the Indian Government and of the India Office. The existence, side by side, of extensive collections of drugs, of a unique Herbarium, and of important living collections, has presented a wide field to investigators in the domain of pharmacognosy, and we accordingly find that pharmacists who have distinguished themselves in that branch of their calling have invariably availed themselves of the facilities provided by Kew. Among these workers we may mention J. E. Howard, Daniel Hanbury, and E. M. Holmes, not forgetting that many investigations on economic botany have been contributed to the Kew *Bulletin* by members of the staff at Kew.

This survey of the London Botanic Gardens would not be complete without some reference to their administration, and, with a

brief account of this, we may appropriately conclude our introduction.

Kew is administered by a government department, namely, the Board of Agriculture, but the organization and direction of the scientific work of the establishment are entirely in the hands of the Director.

The Royal Botanic Society, on the other hand, is a self-supporting body, and depends for its existence upon the subscriptions of its Fellows. The Society's Gardens in Regent's Park are administered by a garden committee of the Council, the Council itself being elected by vote of the Fellows. The executive officer is the Secretary.

The government of the Chelsea Physic Garden is vested in a committee of management consisting of members appointed by the Trustees of the London Parochial Charities, the Treasury, the Lord President of the Council, the Technical Education Board of the London County Council, the Royal Society, the Society of Apothecaries, the Royal College of Physicians, the Pharmaceutical Society, the Senate of the London University, and the representative of Sir Hans Sloane. The Professor of Botany in the Royal College of Science is Scientific Advisor to the Committee, while the funds necessary for the maintenance of the garden are derived chiefly from grants by the London Parochial Charities and the Treasury.

THE ROYAL HORTICULTURAL SOCIETY'S GARDENS.

The Royal Horticultural Society of London was founded in 1804 for the purpose of encouraging the cultivation of ornamental and useful plants. The latter class comprises forest trees and plants yielding various food products, such as fruit trees and culinary plants, but those which fall more particularly within the province of agriculture or medicine are excluded. In 1809 the Society obtained its first charter, and in 1818 a first attempt was made towards the establishment of a garden. In 1819 another piece of ground was taken at Ealing, and the work accomplished there was further supplemented by that of nurserymen in the neighborhood of London, to whom nursery stock and plants were lent. These undertakings, however, were tentative in character, and it was not until 1821 that they took definite shape. In that year the Chiswick Gardens, then thirty-three acres in extent, were established, and they survived,

through many vicissitudes, until 1904, although having then shrunk to an area of twelve acres. Between 1861 and 1887 the activities of the Chiswick Gardens suffered an almost total eclipse, owing to the fact that the Society was involved during that period in a scheme which absorbed all its energies and crippled its finances. This scheme, fostered by the late Prince Consort, consisted in an agreement between the Society and the commissioners of the Great Exhibition of 1851, by which the management of the gardens and conservatory at South Kensington was entrusted by the commissioners to the Society on certain conditions. These conditions were not fulfilled, and in 1887 the commissioners appropriated the land for other purposes. This action led to the reorganization of the Society on its former basis and to the renewal of activities at the Chiswick Gardens. For some time past, however, these gardens, owing to their limited size and to excessive drainage and smoke, had been found unsuitable for the purpose which they were designed to serve. The need of the Society for more suitable accommodation was met in 1903 by Sir Thomas Hanbury, K.C.V.O., who purchased 60 acres of land at Wisley, in Surrey, including the celebrated wild garden of the late G. F. Wilson, F.R.S. This property was placed in trust for the use of the Society, so long as it continued to be used by the latter for the objects aimed at by its founders. Among the prominent features that the Society is introducing into its new gardens we may mention a collection of named varieties of fruit trees, a series of glass houses for experimental culture, and a representative arboretum and rose garden, while the establishment of a physiological laboratory is also contemplated.

This description of the gardens themselves must suffice, but some of the salient features of the work accomplished by the Society prior to 1860, in connection with its gardens, will be touched upon. The Kew system of sending plant collectors abroad was adopted by the Society in 1818, and the plants sent home by them helped to form the collections in the gardens at Chiswick. Among these emissaries mention may be made of George Don, who was sent out in 1821 to the West Indies and Brazil; of Robert Douglas, who explored western North America between 1823 and 1834 and introduced many interesting ornamental plants and forest trees; and of the renowned Robert Fortune, who was sent to China by the Society in 1842. In 1822 Lindley was appointed assistant garden secretary

to the Society, and four years later he became its sole assistant secretary. George Bentham was honorary secretary from 1829 to 1840, and it was to the labors of these two distinguished men that the fame of the gardens in their early days was chiefly due. In 1826 a course of training was inaugurated in the gardens, and this is of interest, inasmuch as the Society was the first in this country to train gardening students. Among the Society's pupils who subsequently achieved distinction we may note Archibald Barron, Sir Joseph Paxton, who designed the Crystal Palace; Robert Thompson, and many others. Bentham and Lindley organized the first flower show at Chiswick in 1833, and it was also during their period of office that the system of heating plant houses by means of hot-water pipes was first resorted to. The naming of the large number of new plants introduced by the Society was carried out principally by Bentham, with the assistance of Lindley, until the resignation of the former from the secretaryship in 1841; the major part of the Society's work then devolved upon Lindley, and, until illness compelled him to relinquish his duties, he was the moving spirit in all the Society's activities. It is in connection with this matter of nomenclature that the Society has rendered one of the greatest services to horticulture, as it is the home of the nomenclature of fruit as well as the parent of the Colonial fruit industry which has now assumed extensive proportions. The first publication issued by the Society was the *Transactions.* This was published from 1805 to 1848, and was followed in 1845 by the *Journal*, which has been issued periodically ever since and constitutes the most important publication of the Society.

A PLEA FOR GREATER ATTENTION TO THE SCIENTIFIC NEEDS OF THE BUSINESS PHARMACIST.[1]

By E. H. Gane, Ph.C., New York, N. Y.

In selecting the subject matter for the annual address to this section I have been influenced mainly by the steadily decreasing interest taken by the great body of pharmacists in the work of our association. While I do not agree with the gentleman who stated at one

[1] Address of the chairman of the Scientific Section of the A. Ph. A. at Atlantic City, September 6, 1905.

of the State association meetings that the American Pharmaceutical Association was in danger of dying of dry rot, I do think that to some degree we have, as it were, reached a "parting of the ways," where it becomes necessary for us to pause for the purpose of determining whether this association shall represent only the purely scientific side of pharmacy and rest content with a small membership, or whether it be not possible to combine our scientific work with the commercial applications thereof, so as to secure recognition from the great mass of business pharmacists.

A WEAK SPOT SOMEWHERE.

We cannot look back over the past record of this association and of this section in particular without a feeling of pride in its achievements for the advancement of the scientific side of pharmacy. But, while taking pride in its scientific achievements, we must not lose sight of the fact that science is of value to the pharmacist only so far as he can make practical application of it. In other words, we must not forget that pharmacy is not in any sense a pure science. It is not confined merely to knowledge of chemical and botanical substances. It includes the practical applications of nearly all chemical and vegetable substances to medicine and to the arts. It should be one of the greatest of applied sciences, and the pharmacist should occupy as high a position as the physician or the chemist. The fact that he does not shows that somewhere in our organization there is a weak spot. In older countries this lack of recognition was attributed to the fact that universities did not recognize pharmacy as worthy of inclusion in their course of study, but this reason fails us when we consider the numerous departments of pharmacy attached to our own universities.

The appeal has frequently been made for more investigations by pharmacists in pure science. That appeal has not been disregarded. Indeed, the tendency of pharmaceutical investigations of late years has been more and more in that direction, and to some extent this is responsible for the lack of interest displayed by the rank and file of pharmacists. Not that I wish for a moment to disparage such work; investigations in pure science are a necessary part of the work of this section. But side by side with investigations in pure science we need to give more attention to the problems confronting the practical pharmacist which require for their solution the aid of

our scientific investigators. What hope is there of securing due recognition of the applied science of pharmacy when the perhaps more fascinating field of pure science attracts most of our most capable workers?

THE SCIENTIFIC CHARIOT IS BEING DRIVEN TOO FAST.

We are tending too much toward the ultra scientific in the work of this section, thus creating a wide gap between the great body of pharmacists and the few to whom they should look for guidance and assistance. We are going ahead too fast for the business pharmacist and assuming too much interest on his part in scientific studies to the neglect of the latest advances in galenical pharmacy.

The new Pharmacopœia strikingly illustrates the truth of these statements. Its chemistry, its botany, its pharmacology show that the revisers have closely studied the latest advances in those sciences, so that little exception can be taken to that portion of the work, but it does not reflect progress in galenical pharmacy. It even exhibits a tendency to follow a section of the medical profession in taking part of its pharmacy from the advertising publications of certain proprietary remedy manufacturers. It may be argued that this is only a reflection of existing conditions in pharmacy, but even so the wisdom of giving it official sanction is doubtful in these days of exactitude in science. The inevitable tendency will be to concentrate the whole of the scientific part of pharmacy in the hands of the manufacturers, thus diverting the interests of pharmacists from pharmaceutical research.

WHAT AMERICAN PHARMACY NEEDS TO-DAY

is a revival of interest in strictly pharmaceutical problems. True, we have a section devoted to practical pharmacy, but the average pharmacist lacks the necessary time and training to pursue scientific problems to a satisfactory conclusion. This work can only be performed properly by those interested in the work of this section. There are many problems awaiting solution which this section could consider without in any way compromising the dignity which rightly surrounds it. A glance at the literature of pharmacy during the last few years shows that progress in pharmacy is practically at a standstill in this country. The era of proprietary specializing may have something to do with this state of affairs, but it is undoubtedly

aided by the preference of investigators for the field of pure science. And yet, even in connection with the commonest of pharmaceutical preparations, there is much research of a scientific character needed. Under existing conditions the ultimate benefit from such researches will go to the manufacturer and not to the pharmacist, but there is still enough pharmaceutical research left and enough in the latest developments of the science and art of healing to prevent the pharmacist from becoming a mere dealer in manufactured specialties.

A REMEDY SUGGESTED.

It is to this section that the pharmacist looks for relief. We need to adopt a more aggressive attitude in dealing with pharmaceutical problems. We have been too prone to bow before the chemist on the one hand and the physician and the surgeon on the other, and to be kicked by both. The pharmacist should lead in knowledge of drugs, their behavior and the best methods of presentation. It should be his part to make practical applications of the results of scientific research, to aid in replacing crude drugs by definite principles, and to urge the abandonment of unscientific and inert products. Individually he can do little, but definite action by this association in co-operation with the American Medical Association should do much to restore his prestige. The suggestion made some years ago by the special Committee on Research to the effect that this association co-operate with the American Medical Association received no attention; hence we have the appointment by the latter body of a Council on Pharmacy and Chemistry, which is a distinct reflection upon the work of this section. The fact that most of the members of the new council are leading members of this association shows that we have not been alive to our opportunities. It would seem that work of the kind initiated by the American Medical Association should at least have been done after consultation with this section, if not in direct conjunction with it. The present agitation affords us an opportunity to get in closer touch with the American Medical Association. Unless guided aright the latter body may do much harm to the cause of pharmacy, and this section should take steps even at this late date to co-operate with the American Medical Association in any investigations the latter may undertake which are of direct pharmaceutical interest. As experts in the science and art of pharmacy we should be quick to

prevent or to resent the usurpation of our functions either by the medical profession or the chemist. As above indicated progress will be slow if left to individual workers. We need to follow the tendency of the times and co-operate in our work. Many scientific bodies to-day adopt the plan of holding symposia on given subjects from time to time. This idea has many advantages. If adopted by us it would systematize to a large extent the work of this section, render it more interesting to the business pharmacist, because more definite results are thus obtained, and it would in particular aid the revisers of future editions of the United States Pharmacopœia. It would not, moreover, interfere with the work of individuals, and its good results have already been exhibited in the reports of the Special Committee on Indicators and the co-operative work on opium assays.

The by-laws of the association instruct the officers of this section to prepare a list of suitable subjects for investigation. This instruction has been more honored in the breach than in the observance thereof, because each worker has been free to follow the line of investigation in which he is especially interested, and this frequently has been of little direct pharmaceutical interest. With the adoption of the co-operative idea it would be possible either for the officers of this section or for a special committee not only to prepare a list of practical subjects for discussion, but to select the investigators best fitted to carry out the work. It should not be difficult to select some subjects which would induce business pharmacists to interest themselves in the work.

SCIENTIFIC SIDE LINES FALLING INTO OTHER HANDS.

Perhaps the greatest advance of recent years has been the application of physical methods to chemical research. It is a branch of chemistry which has already produced brilliant results, and it is a side which is bound to develop more and more every year. It would seem that more attention should be paid to physical problems, not only in our schools of pharmacy, but in the contributions offered to this section. Already certain discoveries in physical science are being applied to medical purposes, and here and there a pharmacist has been quick enough to see the business possibilities therein, but it should be the duty of the leaders in this section to point out to their *confrères* the application of these discoveries to pharmacy. One

by one what I may call the legitimate scientific side lines of pharmacy have passed into other hands through lack of proper information from sources that should guide the business pharmacist.

But by far the most important work confronting us in the immediate future is the question of food and drug adulteration. The vicious attacks of certain proprietary medicine interests through the daily press, and the outcry on the part of ill-informed pure food and drug fanatics are to some extent undermining public confidence in the pharmacist. One of the fundamental objects for which this association was founded was to secure purity in drugs and chemicals, to suppress empiricism and to confine the sale of medicines to regularly qualified apothecaries. Of late years little has been done in this direction until the appointment at the St. Louis meeting of the Special Committee on Drug Adulterations. This committee has been continued from year to year by the chairman of this section, but without regular authorization. The results which have been already reported would seem to warrant its continuance as a standing committee of this section. If the work be continued upon the lines inaugurated by Professor Patch it can be made one of the most powerful influences for the good of the association, the benefit of the retail pharmacist and the general public. It is the commencement of the first systematic attempt to determine to what extent adulteration of drugs and chemicals is practised, and it is gratifying to note that some of the State associations are doing similar work.

The widespread agitation regarding adulterated drugs is to some extent manufactured either for personal or political ends. That adulteration exists we know, but to what extent we do not know, nor do those who are engaged in fostering the agitation; but it is a serious menace to pharmacy in that it represents an organized attempt to take away from pharmacists the control of pharmaceutical products. Such an attempt should be resisted by every means in our power.

DANGER FROM OFFICIAL CHEMISTS.

In an effort to find out what knowledge is possessed by those State officials and chemists who aid in fomenting the question, a letter was addressed to the principal officials of those States which have commissions devoted to food and drug examination asking whether any systematic effort had been made to ascertain to what extent

adulteration of drugs was practised. The further question was asked by what standards the purity of drugs and chemicals was determined. The replies show that in only two or three States has any attempt been made to ascertain facts. Most of the officials state frankly that no work has been done, in some cases from lack of appropriation, in others because they have no direct power, and in some because food work takes up all the time of the chemists. It is instructive to note that many of them express the hope of obtaining legislation and appropriations in the near future. Some vaguely state that there is no doubt that adulteration of drugs is practised to a considerable extent. The replies to the question of standards show that the United States Pharmacopœia is taken as the standard for drugs mentioned therein, but in other cases the standards are arbitrarily fixed by the officials themselves. It is obvious, therefore, that we must be on the alert to avert danger from this source. Already, in spite of warnings, control of drugs and pharmaceutical products has, in at least one State, passed out of the hands of pharmacists. This is largely due to the lack of systematic work on our part. We have already pledged the support of this association to the Bureau of Chemistry in the work they are undertaking, and this support should be material and not merely consist of abstract resolutions. At present we are leaving to chemists, State and Federal officials, work that should be done by ourselves, and we are allowing positions that could and should be filled by pharmacists to be filled by graduates from technical schools and universities, who formulate what have been called "arm-chair standards," and who indulge in "yellow chemistry." The fixing of standards of purity properly belongs to this section, and should form part of our work, either through a special committee or through the Committee on the Drug Market. It should not be left to the pure chemist, for the latter lacks the practical pharmaceutical knowledge and commercial experience which is necessary for the proper formulation of standards.

A QUESTION OF DIRECT INTEREST.

One of the questions directly of interest to the drug trade is that of the use of antiseptics or preservatives and coloring matters in foods and drugs. Manufacturers on the one side and chemists on the other are fiercely debating the subject, and we are apparently

patiently awaiting the result. Is not this a matter in which our particular expert knowledge should be of service? Is it not distinctly a pharmaceutical and medical question? We might well appoint a committee first, to determine whether such adventitious aids are necessary to the proper preservation of foods and drugs, and later, if an affirmative answer be given, to confer with a similar committee of the American Medical Association to determine what coloring matters and preservatives may be classed as harmless, and in what proportion they may be used to secure the desired result without detriment to the public health. This would give us additional opportunity to get in close touch with the leaders in medicine. It is a subject that should not be left to State and Federal officials to determine arbitrarily.

THE SECTION AS A SOURCE OF EXPERT ADVICE ON SCIENTIFIC SUBJECTS.

The agitation by this association of the "coal-tar creosote" question has already borne good results in stopping the sale thereof except under proper precautions. More speedy results would have been obtained had definite action followed the passage of resolutions. Action should be taken by us against the increasing use of wood alcohol in pharmaceutical and household preparations. Recent researches seem to show that methyl alcohol even in its purest form is a dangerous drug when taken internally. The American Medical Association passed a resolution condemning its use, and this section, through the Committee on the Drug Market, should take steps to prevent the sale of the article except under proper precautions. True, we have no legal powers, but the influence of this body is powerful enough if properly exercised to induce at least the majority of manufacturers to follow our advice. Continued action of this kind would ultimately lead the trade to look to this section for expert advice on scientific questions.

The American Chemical Society is giving considerable study to the question of purity in chemicals used for analytical and research work, and will attempt to formulate standards of purity and later to authorize a series of labels by which manufacturers may designate their products, according to the degree of purity and freedom from particular impurities. Is it not equally incumbent upon this association to formulate standards of purity for unofficial chemicals and drugs used in medicine and for household purposes, not only for the

protection of the public, but to protect the pharmacist against unjustifiable prosecution under pure food and drug laws. The Committee on the Drug Market has already started this work consequent upon prosecutions instituted by the Massachusetts State officials for selling unofficial products which did not conform to their arbitrary standards. Unless we take a more active interest in questions of this kind, about the only work of scientific import of direct pharmaceutical interest left for us to do will be to furnish aid in the revision of future editions of the pharmacopœia.

THE DUTY OF THE PHARMACIST.

The powers of the Committee on the Drug Market should be enlarged, and while keeping a watchful eye to detect variations from established standards of purity in drugs and chemicals, its work might well be extended to prevent the sale of many of the utterly fraudulent products offered to the general public to-day. We secure special privileges on the sole ground that the public needs protection from inexpert dealers. Is it, not, therefore, part of our duty to protect the public from the impositions of those who seek to exploit fraudulently the latest achievements in medicine or science? The legal part may be left to the properly constituted authorities, but the exposure of such is properly part of our work. It should not be left, as it mainly is, to newspaper and magazine editors in search of sensations. The scientific portion of the work belongs to this section, the rest would form part of the work of our newly established Committee on Publicity. By agitation of this kind we do not compromise our dignity to any degree, but we do show that the pharmacist is a person who has as definite a sphere of action as the physician or the chemist. We should seek not to pose as scientists in the strict sense of the term, but as experts in everything pertaining to drugs and medicines. More we do not need as pharmacists, by less we would fail to do our whole duty to the public.

By establishing our position in this way, we should be in a position to aid the agitation, already started in some quarters, for representation upon our State Boards of Health and upon food and dairy commissions, and, incidentally, aid in the control of the proprietary medicine business, which is recognized as one of the worst evils confronting pharmacy. Pharmacists have in this country opportunities presented which pharmacists of no other country possess,

and we have only ourselves to blame if we fail to grasp at least some of them.

Conditions in pharmacy at present warrant some departure from past customs. Some of the suggestions made in this address will doubtless appear to many rather iconoclastic. They are not made with any idea of getting the section to take definite action thereon immediately, but in the hope of creating discussion and arousing the interest of pharmacists generally in the affairs of this association.

BOOK REVIEWS.

The National Standard Dispensatory.—Containing the Natural History, Chemistry, Pharmacy, Actions and Uses of Medicines, including those recognized in the Pharmacopœias of the United States, Great Britain and Germany, with numerous references to other Foreign Pharmacopœias. In accordance with the United States Pharmacopœia, eighth decennial revision of 1905 by authorization of the Convention. By Prof. Hobart Amory Hare, Jefferson Medical College, Philadelphia; Prof. Charles Caspari, Jr., Maryland College of Pharmacy, Baltimore; and Prof. Henry H. Rusby, College of Pharmacy of the City of New York. Imperial octavo, 1,858 pages, 478 engravings. Cloth, $7.25, net; leather, $8.00, net; Thumb-index, 50 cents extra. Lea Brothers & Co., Publishers, Philadelphia and New York. 1905.

In the United States the dispensatories have been the commentaries on the Pharmacopœia. That there is a demand for these books is evidenced by the willingness of the publishers of the several dispensatories to spend large sums of money in their publication. When the purchaser receives 256 pages of encyclopedic information, such as is in the National Standard Dispensatory, at an expenditure of one dollar, one wonders that it is possible to do so at a profit to the publishers unless the sales are very great.

The present work succeeds the National Dispensatory of Stille and Maisch. Any one who is familiar with the old National Dispensatory might be inclined to question whether this work is not merely a revised edition of that work. A careful comparison shows, however, that it is an entirely new book. It is, as claimed by the publishers, "a new, practical and authoritative work, containing information on all substances used in medicine and pharmacy

at the present day." The names of the authors are a sufficient guarantee of its being an authoritative work on the drugs and preparations which are used in medicine at the present time. It requires new men to write a new book, and it is fortunate that the publishers secured the services of men in their prime and permitted them to entirely recast the book in accordance with the latest discoveries and researches. There has been a need of just such elimination as has been made in the constructing of the present dispensatory. There has been much in all of the dispensatories which is irrelevant to the books and of but little use to the readers. There is more real information, for instance, in the article of a page and a quarter on Abrus in the National Standard Dispensatory, than was contained in the two-and-one-half-page article on the same drug in the National Dispensatory.

Dr. Rusby has written the botany and pharmacognosy, including the minor as well as the major drugs of the entire globe, a service never before rendered. This part is supplemented by a large number of excellent illustrations by the skilful botanical artist, Mrs. Beutenmüller. Prof. Caspari, with a corps of assistants, has considered the pharmacy and chemistry of the book, giving full information regarding methods and products, with descriptions and explanations of the most approved apparatus and tests. Dr. Hare has written the section on Medical Action and Uses, giving a direct and compact presentation of modern therapeutics. An Appendix of 60 pages contains all necessary tables, formulas, tests, etc., for practical use. The General Index, of about 90 pages, contains full reference to every page in the text, making it a repertory of the world's knowledge of drugs, and the Therapeutical Index, of about 40 pages, contains, under the name of each disease, references to all the medicines employed in its treatment. The volume is embellished with about 478 new and instructive engravings in the text.

The National Standard Dispensatory is creditable to the authors and publishers and will be found useful as a reference book not only by pharmacists and physicians but also by chemists, botanists, and others desiring information on any of the substances used in medicine and in the arts.

A MANUAL OF ORGANIC MATERIA MEDICA AND PHARMACOGNOSY.—By Lucius E. Sayre, Dean of the School of Pharmacy of the Uni-

versity of Kansas. Third revised edition, with Histology and Microtechnique by Prof. William C. Stevens, with 377 illustrations. Philadelphia: P. Blakiston's Son & Co., 1012 Walnut Street. 1905.

This work of Professor Sayre's is intended as an introduction to the study of the vegetable kingdom and the vegetable and animal drugs comprising the botanical and physical characteristics, source, constituents, pharmacopœial preparations, insects injurious to drugs, and pharmacal botany.

The present edition of Professor Sayre's book is based on the eighth decennial revision of the United States Pharmacopœia. The entire work has been gone over; useless or "out-of-date" material has been eliminated; a number of new illustrations have been added and every attempt has been made to bring the book in line with the progress in pharmacy.

Experiments for Students in General Chemistry.—By Prof. Edgar F. Smith, University of Pennsylvania, and Prof. Harry F. Keller, Central High School of Philadelphia. Fifth edition, enlarged, with 40 illustrations. Philadelphia: P. Blakiston's Son & Co., 1012 Walnut Street. 1904.

This little work of 92 pages is intended as a text-book in connection with a course in chemistry for beginners. There are some forty illustrations which will be found helpful to the student in constructing the necessary apparatus. The directions are clear and to the point. There are sufficient questions asked in the course of the work to compel the student to do some thinking on his own account. Taking it all in all the book will be found very useful and whether the student intends to become a chemist or follow any other vocation, he will secure a better grip on fundamental facts in physics and chemistry and a better idea of the nature of chemical elements and the interactions taking place in nature, after a course in chemistry in which a book of this kind is employed, than if he were to read all of the chemistries and not *do* anything for himself.

THE EVOLUTION OF THE CHEMICAL MATERIA MEDICA.

(*Continued from p. 174.*)

SUBSTANCES INTRODUCED BY THE ARABIANS.

Potassium nitrate; called by Geber "Sal petræ."

Acid, hydrochloric, in Aqua Regia. The purer article was known to Basilius Valentinus. Its production by distilling a mixture of sodium chloride and sulphuric acid was described by Glauber, hence its name "Spiritus fumans Glauberi."

Acid, nitric; known to Geber.

Arsenious acid, "white arsenic;" known to Geber. More reliable data was not obtainable until the middle of the XI. century.

Mercuric chloride; known to Geber, Rhases and also to Avicenna.

Mercuric oxide; known to Geber.

Silver nitrate; known to Geber, but was introduced into medicine by Angelus Sala during the XVII. century, when it was known as "Magisterium Argenti," "Crystalli Dianæ."

Alcohol, dilute; stronger alcohol was first produced by Raymundus Lullus, in the XIII. century, who introduced it into the materia medica as "ultima consilatio corporis humani."

Lead acetate; although this was known to Geber, it was not introduced or used as a medicine until 1760, when Goulard produced what was later known as "Aqua vegetomineralis Goulardi."

Camphor; this was first brought to Europe about the middle of the VI. century.

Aqua ammonia; was known to Geber, as was also a more or less pure caustic potash.

SUBSTANCES KNOWN TO, OR INTRODUCED BY, RAYMUNDUS LULLUS IN THE XIII. CENTURY.

Alcohol; stronger.

Ammonium carbonate; produced from urine.

White precipitate.

THE XV. CENTURY CONTRIBUTED:

Potassium sulphate; this may have been known to Isaac Hollandus in the XIV. century. Described by Oswald Croll, about 1608, as "Specificum purgans Paracelsi."

Sulphuric acid; the first known, accurate, description of this substance is attributed to Basilius Valentinus.

Zinc sulphate, "white vitrol;" known to Basilius Valentinus.

Ferric chloride, lead acetate and the spirit of nitrous ether were all known to Basilius Valentinus.

DURING THE XVI. AND XVII. CENTURY WERE ADDED.

Sulphuric ether; discovered by Valerius Cordus, about 1540, and by him described as "Oleum vitrioli dulce," this preparation appears to have been forgotten until rediscovered by Frobenius, a London apothecary, about 1730.

Mercurous chloride; known in Europe in the XVI. century.

Oil of anise, oil of cloves; known to Valerius Cordus.

Benzoic acid; known about 1608.

Antimony and potassium tartrate; produced by Adriano van Mynsicht, 1631.

Zinc chloride; mentioned by Glauber, 1648, as "Oleum lapidis caliminaris."

Sodium sulphate; known to Glauber, 1658.

Potassium permanganate; Glauber, in 1659, noted the peculiar color that was produced on fusing potassium nitrate with manganese dioxide. The composition of potassium permanganate was first described by Mitscherlich in 1830. The name "Chamælon minerale" was given to it by Scheele.

Ammonium acetate; was introduced by R. Minderer during the XVII. century.

Phosphorus; discovered by Brand, in urine, about 1669. More carefully studied by Gahn, 1769, and by Scheele, 1771, who demonstrated its presence in bones.

Sodium borate; probably known at an earlier period, was reintroduced during the XVII. century by the Venetians.

Potassium, and Sodium tartrate; introduced about 1672, by an apothecary, P. Seignette, of Rochelle, France.

Magnesium sulphate; discovered 1694, by Nehemiah Grew, in the water of a mineral spring at Epsom, England.

DURING THE XVIII. CENTURY THERE WERE INTRODUCED.

Magnesium carbonate; introduced as a secret remedy, "Magnesia alba," about the beginning of the XVIII. century. The method of preparing was described by Valentini, 1707, and Slevogt, 1709.

The composition of "Magnesia alba" was demonstrated by Black, 1756.

Boric acid; produced by Homberg in 1702 by the decomposition of borax. Known as "Sal sedativum Hombergi."

Phosphoric acid; produced in 1746 by Marggraf.

Magnesium oxide; in 1755 by Black.

Ether, acetic; first produced by Lauragais, 1759. Method of producing improved on by Scheele in 1782.

Tartaric acid; by Scheele in 1768.

Chlorine; produced by Scheele in 1744, and first known as "Dephlogisticated muriatic acid."

Glycerin; discovered by Scheele in 1779 while preparing lead plaster. He called it "The sweet principle of oils."

Lactic acid; Scheele, 1780.

Citric acid; Scheele, 1784.

Gallic acid; Scheele, 1785.

Tannic acid; Berzelius.

Bismuth subnitrate; first used in medicine by L. Odier in 1786.

Sodium carbonate; first recognized as such by Duhamel, 1736.

Thymol; introduced about the middle of the XVIII. century.

OF THE MORE IMPORTANT DISCOVERIES OF THE XIX. CENTURY WE HAVE:

Morphine; discovered in 1804 by Sertürner, an apothecary's assistant at Paderborn, Germany.

Potassium, Sodium, Boron, in 1807, and Calcium in 1808; by Sir Humphrey Davy, by means of electrolysis.

Iodine; in 1811 by Courtois.

Naphthalin; by Garden in 1816.

Hydrogen dioxide; by Thenard in 1818.

Strychnine; by Pellitier and Caventou in 1818.

Veratrine; by Meiszner in 1818.

Brucine; by Pelletier and Caventou in 1819.

Quinine; cinchonine; colchicine; by Pelletier and Caventou in 1820.

Caffeine; Runge, 1820, and independently also by Robiquet in 1821, and by Pelletier and Caventou.

Potassium iodide; introduced into medicine by D. Coindet in 1821.

Potassium bromide; by Balard in 1826.

Bromine; discovered by Balard in Montpelier, France, in 1826.

Iodoform; produced by Sérullas in 1822, but not introduced into the materica medica until about 1837.

Santonin; discovered in 1830, independently of each other, by two German apothecaries, Kahler in Düsseldorf and Alms in Mecklenburg.

Atropine; isolated by Meins in 1831.

Codeine; by Robiquet in 1832.

Phenol; discovered by Runge, in coal tar, in 1834.

Salicylic acid; in 1839, Kolbe, in 1873, introduced it as an antiseptic.

Chloral hydrate; discovered in 1832 by Liebig. Was introduced as a medicine by Liebreich in 1869.

Chloroform; discovered by Liebig, and also by Soubeiran in 1831. Introduced into medicine by Simpson in 1847.

Theobromine; isolated from the seeds of Theobroma cacao in 1841 by Woskresensky.

Collodion; introduced in 1853 by Maynard and Bigelow.

Physostigmine; by Jobst and Hesse in 1864.

Resorcin; by Hlasiwetz in 1864.

Cocaine; isolated by Gædeke in 1864. Introduced into medicine in 1884 by Koller.

Formaldehyde; discovered by A. W. Hoffman in 1867.

Pilocarpine; Gerrard and Hardy in 1875.

Sodium salicylate; made synthetically by Kolbe's process in 1875.

Naphthol; 1881.

Apomorphine hydrochlorate; used in 1882. The free base had been discovered in 1869 by Matthiessen and Wright.

Antipyrine; discovered by Knorr in 1884.

Acetanilid; discovered by Gerhard, has been in use since 1886.

Phenacetine; 1887.

Saccharin; 1887.

Sulfonal; discovered by Baumann in 1888.

Trional; 1893.

M. I. WILBERT.

PHARMACEUTICAL MEETING.

The first of the series of pharmaceutical meetings of the Philadelphia College of Pharmacy for 1905-1906 was held on Tuesday afternoon, October 17th, with Prof. Samuel P. Sadtler in the chair.

The meeting was devoted to a discussion of the new Pharmacopœia, and in this connection two papers were presented, one by M. I. Wilbert, on "Doses in the U.S.P.," and one by Allen Shryock, on "Our New Pharmacopœia and the Metric System of Weights and Measures," which latter was read in the absence of the author by Charles H. LaWall.

In commenting on the first paper Dr. Lowe said that the comparison which Mr. Wilbert made of the doses in the first revision of the Pharmacopœia and those in the eighth decennial revision showed that there is a tendency to reduce the size of doses. The speaker then called attention to some of the doses in the new Pharmacopœia which he considered to be rather peculiar. As examples he mentioned the dose of honey which is given as 1 fl. dr., while the dose of tamarinds, a more active medicine, is 4 dr.; another example was codeine, the dose for the alkaloid and its salts being the same. He was glad that average doses were given, as there would have been no advantage in giving minimum doses only, and if maximum doses had been given this would have tended to hamper the physician.

Otto Kraus related an instance showing that some physicians have already begun to write their prescriptions in accordance with the new Pharmacopœia, but said that the majority of them have not yet taken cognizance of the important changes which have been made.

Dr. C. A. Weidemann did not agree with the latter statement, and said that physicians are aware of this feature of the work.

Professor Sadtler said that owing to the large number of circulars which had been distributed giving notice of the changes in strength of pharmacopœial preparations, it hardly seemed possible for any physician to be ignorant of them. He then alluded to the personnel of the Sub-committee on Doses, and said it was composed of both physicians and pharmacists, but that the subject was left mostly to the physicians, who, he said, were eminent in their calling, and no doubt had some good reasons for the selection of the doses as given

in the Pharmacopœia. He was of opinion that the greater purity of the medicinal products on the market at the present time might account for the smaller doses now administered of certain medicines.

Mr. Wilbert also remarked on the latter point, and said that previous to the organization of the American Pharmaceutical Association two grades of medicines were brought into this country—one for the Western country and one for the seaboard. The drugs for the Western country were much inferior in quality, and as an illustration of this he mentioned that chalk was substituted for calomel, which of course necessitated a large dose of the preparation.

E. M. Boring was inclined to favor the method adopted in the German Pharmacopœia of giving the maximum and minimum quantities given in twenty-four hours.

E. R. Gatchel referred to the large doses of certain drugs that were prescribed only thirty years ago. He recalled an instance in which 2 ounces of cinchona were prescribed in a dozen powders.

With regard to the use of the metric system of weights and measures Professor Lowe said that it was not only much more convenient in manufacturing, but that it is much better to use the metric quantities than to attempt to convert them into equivalents of the ordinary system.

Several of the retail druggists present contended that nearly all druggists are provided with the weights and measures of the metric system.

Professor Sadtler said that in all or nearly all the colleges of pharmacy the metric system is taught and that when the student graduates he is master of it. But when he goes into the store he comes in contact with ordinary prescriptions. He said that being neither a physician nor pharmacist he was in a position to view the matter more or less impartially, and he was convinced that if physicians would write their prescriptions in the metric system, druggists would compound them accordingly.

Mr. Gatchel spoke of the small percentage of physicians who use the metric system in prescription writing.

Mr. Wilbert contended that if pharmacists would follow the metric system physicians would be more inclined to use it. He then spoke of the advantages of the system in assay work, and said that the calculations can be made both rapidly and accurately. In concluding

his remarks he urged the use of metric weights and measures both in the making and the testing of pharmacopœial preparations.

In speaking of the tests and assay processes of the new Pharmacopœia, Mr. Boring referred to the claim which has been made that the work is more suited to the needs of the manufacturer than of the retail pharmacist.

Henry Blair said that in his experience he had found the metric system to be a source of confusion and that its use does not do away with the use of fractional parts. He said that he frequently had customers of foreign birth who would ask for ½ or ¼ "kilo," but never for gramme quantities. He had furthermore found it impracticable to order goods in metric quantities, only a few houses putting up their goods in this way.

Charles H. LaWall, Instructor in Pharmacy, said that the students under him were thoroughly drilled in the use of the metric system, but that not being required to use it in practice, they regard their knowledge of it as more or less superfluous and of no practical use.

Copies of the first Pharmacopœia published in the United States, and reprinted from the AMERICAN JOURNAL OF PHARMACY, July, 1884, were distributed among the members. The work was published in Lititz, Lancaster County, Pa., March 12, 1778. Mr. Wilbert said that the author, Dr. Wm. Brown, had charge of the hospital at Lititz during the Revolution, and that he was an interesting character, being distinguished as the physician of both Washington and Jefferson.

FLORENCE YAPLE, *Secretary pro tem.*

PHILADELPHIA COLLEGE OF PHARMACY.

MINUTES OF THE SEMI-ANNUAL MEETING.

The semi-annual meeting of the members of the Philadelphia College of Pharmacy was held September 25, 1905, in the Library, at 4 o'clock, the President, Howard B. French, presiding. Twenty members were present. The minutes of the quarterly meeting, held June 26th, were read and approved. The minutes of the Board of Trustees for April 25th, May 2d, 11th, 25th and June 26th were read by the Registrar, Jacob S. Beetem, and approved.

W. A. Rumsey, for the Committee on Nominations, presented the list of proposed nominations for Trustees, which was ordered entered on the minutes. Prof. Henry Kraemer, chairman of the delegates to the American Pharmaceutical Association, read a report. Accompanying the report was an account of the Alumni Reunion, held at Atlantic City. Of those members in attendance,

about 75 were present, and several hours were delightfully spent together. Addresses were made by a number of members and invited guests. Among them were N. H. Martin, of England; S. A. D. Sheppard, Prof. C. Lewis Diehl, Prof. H. M. Whelpley, Dr. A. E. Ebert, Prof. H. V. Arny, Prof. E. G. Eberle, P. C. Candidus, Frank G. Ryan, S. W. Fairchild, Prof. C. S. N. Hallberg, and J. L. Lemberger.

Prof. C. Lewis Diehl presented his lecture notes, taken while a student at the College in 1860. A cablegram, "Hearty Greetings," from H. S. Wellcome and F. B. Power, of London, was also received.

In connection with the report Professor Kraemer presented a scrap book containing invitation cards, letters of acknowledgment and other matters pertaining to the reunion.

The resignation of F. C. Handwork, an associate member, was accepted.

The death of Henry Cramer, a member of the College since 1866, was announced as having occurred July 28, 1905.

A letter was received from Mrs. Marie Hoffmann, widow of Dr. Frederick Hoffmann, an honorary member of the College, acknowledging the receipt of the resolutions of sympathy which had been voted at the meeting of the College held March 27, 1905.

Mr. Thomas S. Wiegand announced that he would give to the College the notes of lectures taken while he was a student, and also those of another old graduate.

Professor Kraemer, in noting the gifts of Prof. C. Lewis Diehl and Mr. Wiegand, said there should be exhibitions from time to time of such articles of historical value as were donated to the College, and efforts made to encourage similar donations from those interested in presenting them, as their value would increase as time goes on.

Harry L. Stiles, Joseph W. England and George M. Beringer were re-elected to membership on the Board of Trustees for the ensuing three years.

The president reappointed Henry Kraemer, W. A. Rumsey, H. L. Stiles, James T. Shinn and C. A. Weidemann to the Committee on Membership.

ABSTRACTS FROM MINUTES OF THE BOARD OF TRUSTEES.

April 25th.—Owing to new pharmacy laws going into effect in several of the States, the Committee on Instruction deemed it wise to propose new requirements for entrance examinations. The report submitted elicited considerable discussion and was laid over for one month.

May 2d.—The Committee on Instruction submitted their annual report, which embraced abstracts from the annual reports of the Faculty received by the Committee, which in part were as follows:

Department of Theory and Practice of Pharmacy.—New features have been introduced; the lectures somewhat modified by the necessity of introducing facts in connection with the revision of the United States Pharmacopœia.

Course in Commercial Training has been improved and extended.

Course in the Dispensing Laboratory has been greatly appreciated.

Department of Chemistry.—The first-year work has been carried on very satisfactorily. The instruction covered chemical physics and non-metallic elements.

The second-year instruction covered the acids from the non-metallic elements, metallic salts, metals, etc.

In the Senior Class the subject of organic chemistry, its application to pharmacy, has been extensively treated. The supplementary course of two lectures per week just completed covered the following subjects: Technical Organic Analysis and Food Adulterations.

Department of Analytical Chemistry.—Every available desk was utilized, and it may be necessary in the near future to arrange for more sections. The extension of the course for the third-year students enabled the professor to enlarge upon the work given in previous years, and included the following: Gravimetric, Volumetric, Gasometric and Urine Analyses, Fehling's Solution, Tests for Elements and Organic Compounds, Alkaloidal Assays, Oils, Fats, Waxes, Food Adulterations and Preservatives.

Department of Botany and Pharmacognosy.—The professor directs attention to the need of more time in the first and second year, in order to give the students a firmer grasp on this part of the work. For some years past he has been making a collection of the different commercial varieties of each drug, and believes it is one of the best and largest collections of this kind to be found.

Department of Materia Medica and Pharmacology.—Results of the work in the first year have been quite satisfactory. The extension of the third-year course has made it possible to rearrange the second-year course, which had been previously overcrowded. In the third-year class the results shown by the examination were that the percentage of those obtaining a grade of very satisfactory greatly exceeded all previous records.

May 11th.—The degree of Master in Pharmacy, *Honoris Causa*, was conferred upon Prof. Frank X. Moerk, and also upon Prof. Chas. H. LaWall—in course.

May 25th.—The report of the Committee on Instruction relating to entrance examinations was further discussed, and after a number of alterations had been proposed, were considered *seriatim* and adopted.

Professor LaWall was appointed Instructor in Algebra, this position being made necessary by the new entrance requirements.

The appointment of an Instructor in Latin was referred to the Committee on Instruction with power to act.

June 6th.—A vote of thanks was tendered to Professor Henry Leffmann, for his donation of two volumes of "Hermetic Alchemical Writings of Paracelsus," translated by A. B. Waite.

Prof. Wallace S. Truesdell was elected Professor in Latin.

Ambrose Hunsberger was elected to active membership.

Amendments to By-Laws were proposed, made necessary by changes in the curriculum.

C. A. WEIDEMANN, M.D.,
Recording Secretary.

ALBERT HILGER,
1839–1905.

THE AMERICAN
JOURNAL OF PHARMACY

DECEMBER, 1905.

A CRITICAL REVIEW OF THE INORGANIC CHEMISTRY OF THE NEW UNITED STATES PHARMACOPŒIA.

By Henry W. Schimpf.

(*Continued from page 520.*)

The inorganic substances which have been dismissed from the Pharmacopœia are the following: Ammonii nitras, Antimonii oxidum, Antimonii sulphidum, Antimonii sulphidum purificatum, Antimonium sulphuratum, Argenti iodidum, Barii dioxidum, Ferri iodidum saccharatum, Ferri lactas, Ferri valerianas, Hydrargyri cyanidum, Hydrargyri subsulphas flavus, Liquor ferri acetatis, Liquor ferri citratis, Liquor ferri nitratis, Liquor sodii silicatus, Magnesii citras effervescens, Oleatum zinci, Plumbi carbonas, Potassa cum calce, Potassa sulphurata, Sodii carbonas, Sodii carbonas exsiccatus, Zinci phosphidum. Most of these will never be missed and their dismissal rids the Pharmacopœia of so many useless articles. Several of these dismissed articles are, however, preparations of recognized worth and largely used, and it seems a mistake to have dropped them from the list of official substances; among them may be mentioned: Ferri valerianas, Hydrargyri subsulphas flavus, Potassa sulphurata, Sodii carbonas, and Zinci phosphidum.

Ammonii Nitras is employed chiefly in the making of nitrous oxide gas, which is used largely by dentists as a general anæsthetic when extracting teeth. Very few dentists, if any, make their "laughing gas," it being found more convenient and cheaper to buy it of the manufacturers, from whom the gas may be obtained in tanks.

Barii Dioxidum owed its presence in the U.S.P. of 1890 to the fact that a method for the preparation of Aqua hydrogenii dioxidi was

given in which the barium dioxide was used. Few pharmacists attempted to make their own hydrogen dioxide, for, though explicit directions were given in the U.S.P., no little skill is required in its preparation, and being marketed so cheaply it was found more advantageous to buy than to make it. Hence the Committee of Revision saw fit to omit a process for the manufacture of hydrogen dioxide and in consequence to dismiss barium dioxide.

Ferri Valerianas has many friends and is very frequently prescribed. There seems to be no valid reason for its dismissal.

Hydrargyri Subsulphas Flavus.—Turpeth mineral has been official in the U.S.P. for over half a century. It has been used principally as an emetic in croup, and the promptness and certainty of its action in this disease has been the means of saving many an infant's life. It is still frequently prescribed and highly esteemed by many practitioners, and therefore might have been retained.

Liquor Ferri Acetatis, *Liquor Ferri Citratis*, and *Liquor Ferri Nitratis.*—The second of these was formerly employed for making Ferri citras and Ferri et ammonii citras, according to the U.S.P. of 1890. These salts, as well as other scale salts of iron, were rarely made by the pharmacist, and therefore it was considered unnecessary to retain methods for their preparation; hence no further use for Liquor ferri citratis.

The other two liquors were not of sufficient use to warrant their retention.

Potassa Sulphurata is still largely used in various skin diseases in the form of lotions, ointments and baths. It would seem, therefore, that this might better have been retained, especially because of its unstable nature and the possibility that its dismissal with the consequent withdrawal of an official limitation of impurities, would lead to the production of a poor commercial article. Whether the dismissal of sodium carbonate and exsiccated sodium carbonate and the introduction of the almost unknown monohydrated sodium carbonate was a wise step or not, will be left for the future to decide. The change seems an uncalled for one.

CHANGES IN LATIN TITLES.

Regarding the changes of official Latin titles of the inorganic substances, it must be admitted that every one of them gives the more correct name and, according to modern chemical nomencla-

ture, accurately represents the chemical character of the substance named. Speaking of names reminds us that it was expected that in the new Pharmacopœia the recommendations of the American Association for the Advancement of Science as to the spelling of chemical terms would be adopted. This, however, is not the case. Unfortunately so, as most of the recent chemical text-books (not based upon the U.S.P.) and many pharmaceutical and medical journals have adopted this more rational spelling. The reason given for this omission is: "The dropping of the final *e* for the alkaloids and the halogens was not approved for the reason that its use has become a thoroughly established custom in this country, and it was not deemed wise or safe to sacrifice this distinctive method of designating powerful substances used in medicine."

Though this reason shows commendable care and foresight on the part of the committee, the reason given is hardly a sufficiently good one.

The dropping of the final *e* from the names of alkaloids would certainly cause confusion in the case of glucosides, whose names mostly end with *in*. However, this might have been overcome by retaining the final *e* in the case of alkaloids, but in other respects conforming to the spelling adopted by the A.A.A. S., as, for instance, chlorid, bromid, sulfate, oxid, etc.

Acidum Arsenosum is now *Arseni Trioxidi.*—This substance is not an acid; hence the old name is a misnomer. Its chemical composition is As_2O_3; hence it is an arsenous oxide. This oxide when dissolved in water is converted into arsenous acid, as here shown by equation $As_2O_3 + 3H_2O = 2H_3AsO_3$. Arsenous acid exists in solution only, and cannot be obtained in an isolated condition. The official arseni trioxidi is therefore the anhydride of arsenous acid.

Acidum Chromicum is now *Chromii Trioxidi.*—What was said of arsenous acid is likewise true of chromic acid. It has long been called chromic acid, but is really the anhydride of chromic acid $CrO_3 + H_2O = H_2CrO_4$, and its correct name is that which is now given in the U.S.P.

Alumini Hydras is now, as it should be, *Alumini Hydroxidum*, its chemical formula being $Al_2(OH)_6$.

Aqua Chlori was the correct name for the preparation formerly official, but the chlorine water of the new Pharmacopœia is a more composite preparation. It is made by adding a small quantity of

hydrochloric acid largely diluted with distilled water to some potassium chlorate contained in a flask. A reaction takes place, chlorine is disengaged and dissolves in the water. Chlorine water so made is, of course, contaminated with certain subsidiary matters, such as free hydrochloric acid, potassium chloride and some ClO_4, which, however, do not detract from its efficacy as a remedial agent, but containing as it does other substances besides chlorine, dissolved in water, *Aqua chlori* was not considered a correct name, and the title *Liquor chlori compositus* was adopted. It would seem perfectly proper, however, to retain the name of Aqua chlori.

The object of making this change in the preparation of chlorine water is to avoid the very disagreeable job of preparing it as was formerly done by acting upon manganese dioxide with hydrochloric acid and conducting the chlorine gas into distilled water. The operator during this method exposed himself unavoidably to the pungent and very harmful chlorine gas.

The product is very unstable, the chlorine uniting upon very short exposure to light, with the hydrogen of the water, forming hydrochloric acid; therefore it had to be freshly made whenever wanted. The new method enables the pharmacist to prepare chlorine water extemporaneously, rapidly, and at any time it is called for, without the need of rigging up an apparatus and without the exposure to an irritating gas. Chlorine water is official in the German Pharmacopœia under the name of Aqua chlorata. No method of preparation is given, but it is directed to contain 0·4 to 0·5 per cent. of chlorine.

It is also official in the British Pharmacopœia under the name of Liquor chlori.

The new U.S.P. gives no method for its assay as did that of 1890, but it directs that it be freshly prepared when called for.

Calx Chlorata is now more properly called *Calx Chlorinata.* "A compound resulting from the action of chlorine upon calcium hydroxide and containing not less than 30 per cent. of available chlorine. It is often improperly called 'chloride of lime.' It should be kept in well-closed vessels and in a cool and dry place." The exact chemical constitution of this preparation is not known, but it is a mixture principally of calcium chloride and calcium hypochlorite with some calcium hydroxide; its active constituent is the hypochlorite, which is a very unstable compound and decomposes

readily upon exposure, disengaging chlorine. It is this chlorine, the "available chlorine," to which the preparation owes its value as a bleaching and disinfecting agent.

The composition of chlorinated lime is most frequently expressed $CaCl_2 + Ca(ClO)_2$.

The Pharmacopœia of 1880 required it to contain 25 per cent. of available chlorine, that of 1890 35 per cent., the present Pharmacopœia requires 30 per cent., which is more nearly the quantity found in commercial samples. Theoretically it should contain about 39 per cent. This preparation is also official in the German Pharmacopœia under the name of *Calcarea Chlorata*, and is required to contain 25 per cent. of available chlorine.

The assay process for available chlorine, as given in the U.S.P., depends upon liberating the chlorine by the addition of hydrochloric acid, then by the introduction of potassium iodide, taking up the chlorine and liberating an equivalent of iodine, which is titrated with one-tenth normal sodium thiosulphate V. S. The quantity of the latter consumed multiplied by the factor for chlorine, 0·003518 gramme, gives quantity of chlorine present. The assay process differs from that of the previous Pharmacopœia in that a larger quantity of the chlorinated lime is taken and considerable more water used. Thus more complete solution is attained. A definite quantity of this mixture is taken for analysis. The insoluble lime residue undoubtedly interfered with the attaining of correct results in the old method, which were uniformly too low. The new method is a better one, but might be improved by directing that the quantity of solution taken for analysis be decanted from the sediment, instead of that the mixture be shaken, and then 100 c.c. taken for analysis. Starch is not used as an indicator.

Argenti Nitras Mitigatus is the Argenti nitras dilutus of the Pharmacopœia of 1890, and Argenti et potassii nitras of the British Pharmacopœia. It should contain not less than 33.3 per cent. of silver nitrate. In the 1880 Pharmacopœia it contained 50 per cent.

Potassa is now more properly called *Potassii Hydroxidum.*—For over half a century it has been officially called potassa. Strictly speaking, potassa is K_2O as soda is Na_2O, whilst the substance which has so long borne this name is an hydroxide.

The official Potassii hydroxidum should contain 85 per cent. of pure anhydrous potassium hydroxide and not more than 2 per cent.

of other inorganic substances, with the exception of water. The 1890 Pharmacopœia requires it to contain 90 per cent., as does also the German Pharmacopœia, in which it is called Kali causticum fusum. Neither the new Pharmacopœia, nor that of 1890, nor the German, give a method for its preparation, though at least three previous decennial revisions of the U.S.P. directed it to be made by evaporating the liquor potassæ in iron or in silver vessels, and pouring the fused mass into suitable molds. Methods for making liquor potassæ were given in each of these Pharmacopœias and in that of 1890. The method of preparing this solution consisted in reacting upon potassium carbonate with slaked lime, and adding a sufficient quantity of distilled water to make a 5 per cent. solution. The reaction is thus illustrated: $K_2CO_3 + Ca(HO)_2 = 2KHO + CaCO_3$.

In the British Pharmacopœia potassium carbonate is used directly, but in the U.S.P., 1890, and before, potassium bicarbonate was employed. The solution of the latter was heated until effervescence ceased, *i. e.*, until the bicarbonate was converted into carbonate, and then poured into the slaked-lime solution. The use of the bicarbonate insured a purer product. The carbonate is never as pure a salt. In the former U.S.P.'s the potassa was made from the liquor, whilst in the present the liquor is made from the dry potassii hydroxidum.

A very pure potassium hydroxide may be made by the reaction between potassium sulphate and barium hydroxide $K_2SO_4 + Ba(HO)_2 = 2KHO + BaSO_4$. When made this way it is called *potash by baryta.* The fact that most of the possible impurities of potassium hydroxide are insoluble in alcohol, while the hydroxide itself is readily soluble, makes it possible to obtain a pure product by the use of alcohol. The commercial product being digested in alcohol, the solution filtered, and the alcohol evaporated. When so made it is called *potassa by alcohol.*

The tests for identity given comprise (1) its non-volatile nature; (2) its violet-colored flame; (3) its intense alkaline reaction; (4) the yellow precipitate with platinic chloride T. S.; (5) the white precipitate of bitartrate upon treatment with excess of tartaric acids T. S.

The tests for impurities include the time-limit test for heavy metals, and the efflorescence test for carbonates. The 1890 U.S.P. gave also tests for calcium, chloride, sulphate, silicate, nitrate, and for soda. *The volumetric assay* method is much more satisfactory than that of the old U.S.P. In the old process 0·56 gramme of potassa

were weighed off for analysis. It is not an easy matter to do this, because when exposed to air the potassa rapidly absorbs both carbon dioxide and water in sufficient quantity to materially increase its weight, even whilst the weighing is being done. The new process directs that *about* 1 gramme be introduced into a stoppered weighing bottle and its weight accurately ascertained. Another improvement is the use of methyl orange instead of phenolphthalein as indicator.

Soda is now *Sodii Hydroxidum.*—It should be 90 per cent. pure. It is intensely alkaline and imparts an intense yellow color to the flame. It is tested for organic and insoluble matters, potassium, carbonate, silicate and heavy metals. It is assayed volumetrically in the same manner as potassium hydroxide. No method for its preparation is given. It enters into liquor sodii hydroxidum. Much that was said of potassium hydroxide is also true of sodium hydroxide. In the old Pharmacopœia the heavy metals are detected by the sulphide test, whilst in the new by the time-limit test. The old also gives tests for calcium, for chloride, for sulphate and for nitrate.

Ferri Oxidum Hydratum is still official, but its name is changed to *Ferri Hydroxidum*, which is certainly more in accordance with our present nomenclature.

It is prepared as formerly by the reaction between solution of ferric sulphate and ammonia water, the reaction being expressed by the equation $Fe_2(SO_4)_3 + 6NH_4OH = Fe_2(OH)_6 + 3(NH_4)_2SO_4$. The new process calls for a larger quantity of ammonia water, but the same quantity of ferric sulphate solution as before; the latter is, however, 2 per cent. stronger than that of the 1890 U.S.P. Double the quantity of water is used for diluting the ammonia water previous to the addition of the iron solution. The directions for making it in haste when required as an arsenic antidote have been omitted. There is no pharmacopœial use for the ferric hydroxide since emplastrum ferri and trochisci ferri have been dismissed.

Attention is called to the fact that the new Pharmacopœia gives the chemical formula of ferric hydroxide as $Fe(OH)_3$. This assumes that the atom of iron in the ferric salt is trivalent,

$$Fe \begin{array}{l} \diagup O\text{—}H \\ \text{—} O\text{—}H \\ \diagdown O\text{—}H \end{array}$$

More frequently we see the formula of this salt written $Fe_2(OH)_6$ when the iron atom is assumed to be quadrivalent, or pseudo-trivalent. According to this view the constitution of ferric hydroxide is graphically represented thus

```
      / O—H
     / O—H
Fe — O—H
 |
Fe — O—H
     \ O—H
      \ O—H
```

There are good reasons for believing that the atoms of iron as well as those of chromium and manganese have trivalent power, in which case ferric hydroxide would be correctly represented by the formula $Fe(OH)_3$; with our present knowledge, however, it is difficult to say which of these views is correct. Ferri hydroxidum, U.S.P., if used as an arsenical antidote must be freshly prepared to be of the most benefit, but, before using, care should be taken to completely remove all excess of ammonia which, being a caustic, is itself harmful. The thorough washing of the precipitated ferric hydroxide for the removal of ammonia cannot be quickly enough done, when, as is usually the case, the antidote must be administered without delay, hence it is recommended to employ *Ferri Hydroxidum cum Magnesii Oxido.* This latter preparation was formerly official under the name of Ferri oxidum hydratum cum magnesia. It is prepared by adding a mixture of magnesium oxide and water to a diluted solution of ferric sulphate. The reaction which takes place results in the formation of ferric hydroxide and magnesium sulphate. There is no necessity for washing, and the mixture can be given at once, as the presence of the magnesium sulphate is an advantage rather than otherwise.

Liquor Sodæ Chloratæ is now called *Liquor Sodæ Chlorinatæ.*—The method of preparation is the same as that of the old Pharmacopœia. In the new book, monohydratic sodium carbonate is used, and this being stronger than the hydrous salt, a much smaller quantity is taken. Calx chlorinata of the present U.S.P. is 30 per cent. strength, while that of the old U.S.P. was 35 per cent., hence a larger quantity of this compound is taken. The resulting product contains 0.2 per cent. less of available chlorine. This compound,

like calx chlorinata, owes its value to available chlorine. It is a mixture principally of sodium chloride and sodium hypochlorite and is most frequently represented by the formula $NaCl + NaClO$. It is a clear, very pale greenish liquid, having a faint odor of chlorine and a disagreeable alkaline taste. It at first colors red litmus paper blue and then bleaches it. The assay process consists in liberating available chlorine by the use of hydrochloric acid, then after the addition of potassium iodide from which a quantity of iodine (equivalent to the available chlorine) is set free, the mixture is titrated with sodium thiosulphate (tenth-normal V. S.), the end reaction being the discharge of the iodine color. No starch is used as indicator.

Magnesia is now *Magnesii Oxidum.*—It should contain, after ignition, not less than 96 per cent. of pure magnesium oxide (MgO). It should be kept in well-closed vessels because of its proneness to absorb moisture and carbon dioxide on long exposure to air. This article has been official under the name of magnesia for over half a century, and processes for its manufacture given until 1890. It is official also in the German Pharmacopœia under the name of magnesia usta. It is prepared by heating light magnesium carbonate in a crucible to a low red heat until all water and carbon dioxide are expelled, *i. e.*, until a small portion taken from the centre of the crucible does not effervesce with diluted sulphuric acid.

$(MgCO_3)_4Mg(OH)_2 + 5H_2O = 5MgO + 4CO_2 + 6H_2O$ magnesium oxide is almost insoluble in water, requiring for solution over 5,000 parts of water at the ordinary temperature and about 36,000 parts of boiling water. When moistened with water the mixture is faintly alkaline in reaction to litmus. The tests for sulphate and chloride are omitted, the test for metallic impurities by means of sulphide test has been replaced by the time-limit test. In the old Pharmacopœia not more than 5 per cent. of its weight should be lost on ignition, the new U.S.P. not more than 15 per cent. (limit of water hydration). An assay method is introduced; this consists in dissolving a definite weight recently ignited magnesium oxide in a measured excess of normal sulphuric acid V. S., and then retitrating with normal potassium hydroxide, methyl orange being employed as the indicator. This is a very satisfactory process.

Magnesii Oxidum Ponderosum, heavy magnesium oxide, was formerly *Magnesia Ponderosa.*—This is of exactly the same chemical composition as the foregoing, but is a very dense powder, whilst the

foregoing is very light and bulky. Its chief advantage lies in its density, which permits a decrease in the bulk of the dose amounting to about one-fourth. It is prepared by calcining the heavy carbonate, but may also be prepared by triturating the light variety.

Mangani Dioxidum is now *Mangani Dioxidum Præcipitatum.*—The black oxide of manganese of the old Pharmacopœia was the native crude manganese dioxide, containing at least 66 per cent. of the pure dioxide (MnO_2). The same was official in the 1880 U.S.P. under the name of Mangani oxidum nigrum. Its principal use was in the manufacture of chlorine water, for which purpose this was considered sufficiently pure. In the present U.S.P. aqua chlori is replaced by liquor chlori compositus, in the preparation of which manganese dioxide is not employed. The latter is, however, so frequently prescribed for internal administration, that it was deemed advisable to retain it among the official articles, but in a much purer state, hence mangani dioxidum præcipitatum was made official. This is made by reacting upon pure manganese sulphate with ammonia water and hydrogen dioxide. A precipitate consisting chiefly of manganese dioxide results, which is thoroughly washed and dried. It contains also other oxides of manganese, but should correspond to not less than 80 per cent. of manganese dioxide. In the old Pharmacopœia a test for organic impurities is described which is omitted in the new. The test for metallic sulphides, by treatment of the dioxide with diluted hydrochloric acid, in which attention is paid to the gas evolved, *i. e.*, if odor of hydrogen sulphide, or blackening of lead acetate paper occurs, is omitted. The test for *antimony sulphide*, in which it is directed to heat the mixture of manganese dioxide and hydrochloric acid and treat the filtered solution with hydrogen sulphide T. S. and obtain an orange-colored precipitate, is replaced by an inferior test, whose only advantage lies in not requiring the use of hydrogen sulphide. In this test, if to 1 gramme of the dioxide and 2 grammes of oxalic acid 20 c.c. of water be added followed by 3 c.c. of sulphuric acid and the mixture digested for three hours in a water bath, complete solution should be effected. This test also detects other (insoluble) substances. The *gravimetric assay* method of the old Pharmacopœia, in which 1 gramme of the dioxide treated with hydrochloric was required to oxidize a definite weight of ferrous sulphate, is replaced by a fairly satisfactory volumetric method. In this 0·2 gramme of the

dioxide are dissolved in a mixture of 50 c.c. of tenth-normal oxalic acid V. S. and 3 c.c. of sulphuric by heating on a water bath, the resulting solution diluted with 100 c.c. of warm water and the excess of oxalic acid V. S., found by retitration with tenth-normal potassium permanganate V. S. not more than 13 c.c. of which should be required. The reaction may be expressed by the equation

$$MnO_2 + (H_2C_2O_4 + 2H_2)O + H_2SO_4 = MnSO_4 + 4H_2O + 2CO_2$$

Potassii Bichromas is now *Potassii Dichromas* ($K_2Cr_2O_7$).—This change is a perfectly proper one, the new name being more in accord with our present views regarding chemical nomenclature. A bi salt is one in which part of the hydrogen of the acid is replaced by a metal, thus a bi salt contains an atom or more of hydrogen, which this salt does not contain. Looked upon as potassium chromate, $K_2CrO_4 + CrO_3$, it may be properly called dichromate. The tests are the same as in the old Pharmacopœia, though when used as a test-solution a quarter degree of purity is required. The salt should contain 99 per cent. of pure potassium dichromate.

Sodii Hyposulphis is now called *Sodii Thiosulphas*.—This salt has long been erroneously called hyposulphite; it is a powerful reducing agent and is employed in photography to dissolve out of negatives the unaffected haloid salts of silver, thus "fixing" the picture. It is the "hypo" of the photographer. Our present nomenclature would represent hyposulphite of sodium by the formula Na_2SO_2, whilst the salt under discussion is a salt of thiosulphuric acid ($H_2S_2O_3$) and its chemical formula is $Na_2S_2O_3$. This salt crystallizes with 5 molecules of water, and should contain not less than 98 per cent. of pure salt. The qualitative tests are the same as those given in the old Pharmacopœia, with the exception of the time-limit test for heavy metals and the modified Gutzeit's test for arsenic. The assay method is the same, except that a larger quantity of the salt is taken for analysis and the use of starch as an indicator is discarded.

Sodii Sulphocarbolas is now called *Sodii Phenolsulphonas*, $NaC_6H_5O_4S + 2H_2O$.—It should contain not less than 99 per cent. of pure sodium paraphenolsulphonate ($C_6H_4(OH)SO_3Na$). The tests are the same as before, with the exception that metallic impurities are detected by the time-limit test, and the tests for sulphate and for chloride are omitted.

Zinci Valerianas is now called *Zinci Valeras*, $Zn(C_5H_9O_2)_2 + 2H_2O$.—The tests for impurities comprise the time-limit test for the detec-

tion of arsenic, cadmium, lead, copper, etc., which were detected by hydrogen sulphide in the 1890 U.S.P. The absence of iron is determined by the complete solution of the zinc valerate in solution of ammonium carbonate instead of in ammonia water. A test for chloride and one for sulphate is given, but the test for alkalies, magnesium, etc., is omitted. The modified Gutzeit's test for arsenic is also given. The salt should be 99 per cent. pure.

(*To be continued.*)

LONDON BOTANIC GARDENS.

By Pierre Élie Félix Perrédès, B.Sc., F.L.S.,
Pharmaceutical Chemist.
A Contribution from the Wellcome Research Laboratories, London.

(*Continued from p. 530.*)

II.

KEW GARDENS.

The present Royal Botanic Gardens at Kew are the result of the fusion of two royal domains, viz., (1) Richmond Gardens, and (2) the original Kew Gardens—the latter corresponding roughly to the private grounds of Kew House, a substantial private house which was demolished in 1803. This fusion, contemplated by an Act of Parliament passed in 1765 and giving George III power to cause the lane separating the two gardens "to be shut up and discontinued," was eventually accomplished in 1802.

It will be convenient to deal separately with the histories of these, prior to their fusion, beginning with that of Richmond Gardens.

RICHMOND GARDENS.

These gardens, which have contributed the western half to Kew as it exists to-day, were associated with a royal residence as far back as the reign of Edward I, who converted the "Manor House at Sheen," which lay to the south of the gardens, into a royal palace. This building was burnt down in the reign of Edward VI, by whom it was rebuilt and named Richmond. It was sold in 1650, and its reversion to royal hands appears to have taken place in the reign of Queen Anne or of William III, although the accounts dealing with the history of the palace and its gardens during this period

PLATE IX.

MAIN ENTRANCE TO KEW GARDENS.

are somewhat conflicting; they are known, however, to have been in the possession of the Duke of Ormonde for several years before they became the property of Queen Caroline, wife of George II.

The palace had been rebuilt a second time by the Duke of Ormonde, and Queen Caroline spent large sums in converting the gardens into pleasure grounds and adorning them with ornamental buildings. Queen Caroline died in 1737, and Richmond Gardens remained unchanged until George II's death in 1760, but all traces of her occupation were obliterated in the reign of George III. In the early part of the nineteenth century "Love Lane," which separated these from the original Kew Gardens, was abolished, as mentioned above.

KEW HOUSE AND ITS GROUNDS.

The building stood in the private grounds of the present palace and to the south of it. Lord Capel, of Tewkesbury, who died Lord Deputy of Ireland in 1696, came into this property by marriage with the daughter and heiress of its former owner, Richard Bennett, Esq. Lord Capel was much devoted to the culture of plants, and it is to his collections that the origin of the botanical history of Kew is traced. Lady Capel survived her husband, and died in 1721. Kew House then passed to Samuel Molyneux, Esq., who had married Lady Elizabeth, grand-niece of Lord Capel. About the year 1730, Frederick, Prince of Wales, obtained a long lease of Kew House and its gardens from the Capel family, and caused a new arrangement of the gardens to be carried out. He died in 1751, and his widow, the Princess Augusta of Saxe Gotha, Dowager Princess of Wales, who survived him for twenty-one years, gave to them the scientific character which has since developed into their most salient feature. In 1759 William Aiton, a former pupil of Philip Miller at the Chelsea Physic Garden, was engaged by her to establish a Physic Garden. John Haverfield was chief gardener, and on the death of George II in 1760 appears to have had Richmond Gardens put in his charge, Aiton remaining at Kew. When Haverfield died in 1784, Aiton succeeded to Haverfield's post, and, until his death in 1793, the management of both gardens was entrusted to him. Soon after Aiton's appointment extensive works were carried out at Kew, notable among these being a "stove" warmed by pipes containing hot air.

The practice of sending out collectors from Kew was inaugurated

during Aiton's period of office, when Francis Masson was sent to the Cape in 1772, remaining there three years. It is to one of these early collectors, David Nelson, assistant botanist on Cook's third voyage (1776–1779), that we are indebted for the specimen on which the extensive genus *Eucalyptus* was founded by L'Héritier.

In 1789 William Aiton published his *Hortus Kewensis* or catalogue of plants growing at Kew. This work, which was the forerunner of the present elaborate hand-lists of plants grown at Kew, contains descriptions of 5,500 species, classified according to the Linnean system.

In connection with Aiton's *Hortus Kewensis* it is worthy of note that the name of Sir Joseph Banks is of the most frequent occurrence in it; a fact which reminds us of the influence that this indefatigable patron of natural science wielded at Kew during the latter part of the eighteenth century and at the beginning of the nineteenth. Under the Princess Augusta's control of the Gardens, John Stuart, third Earl of Bute, had been her scientific advisor, and had taken an active part in the botanical development of Kew. George III, after the death of his mother, the Princess Augusta, in 1784, fostered this development, and eventually bought the freehold of Kew House and its gardens from the Dowager Countess of Essex. Until the death of this monarch in 1820, Sir Joseph Banks occupied a similar position to that previously held by Lord Bute (who had fallen out of favor with George III), and became, virtually, director of Kew. Under his direction the gardens enjoyed a period of exceptional activity, and became a centre of botanical exploration and horticultural experiment unparalleled before or since.

William Townsend Aiton succeeded to the post which his father, William Aiton, had so ably filled, and published a second edition of the *Hortus Kewensis* in 1813. The efficiency of Kew, however, was mainly dependent upon the direction of Sir Joseph Banks, stimulated by the interest which George III took in his domains at Richmond and Kew. When the King became permanently insane, in 1810, a retrograde movement set in which continued for the next thirty years. Sir Joseph Banks and King George III both died in 1820, and during the two succeeding decades after their deaths, Kew practically ceased to have any standing as a scientific institution, and its collections were dismembered, the most valuable of them being deposited in the British Museum.

Before passing on to the events which reinstated Kew to its former position, a short summary will be given of the salient facts in its history which have not already been dealt with. Among the many evidences of Sir Joseph Banks' energy, mention may be made of the magnificent drawings of plants executed by Francis Bauer, an Austrian, who, with the King's sanction, was engaged in 1790 as draughtsman to the Botanic Gardens. Albeit, Sir Joseph Banks paid his salary during his own lifetime and arranged for its continuance after his death. Another of Sir Joseph Banks' projects was the foundation of a herbarium and library at Kew; a beginning was made with the latter, but the former was not effectually accomplished until 1852, when the oldest portion of the present building was first used for that purpose. It was this very building, known in Banks' time as "Hunter House," that he had proposed to utilize for that purpose.

The beginning made in 1802 towards the incorporation of Richmond with Kew Gardens seems to have progressed but slowly. It will, however, be convenient to treat them as one from this date, and to consider them under the general heading of

KEW GARDENS AND PLEASURE GROUNDS.

In 1823 George IV acquired the western portion of Kew Green, including an old road which led from thence to Brentford Ferry; the wall which divided the Royal Gardens from this road was removed by William IV in 1830. By these means a portion of the present herbarium and the whole of its site, the old Kew Gardens, and the former Richmond Gardens, became a single royal domain; and the fusion proved, incidentally, to be the first step towards the opening up of Kew to the public.

In the reign of William IV, W. T. Aiton had become Director-General of Kew, but in addition to this he held numerous other posts, with the result that Kew received little attention, especially as the sovereign took comparatively little interest in it. The present plant house, near the main entrance, is, however, an heritage from William IV, who had it removed there from Buckingham Palace. It has already been indicated that the gardens had been rendered accessible to the public; and in proportion as the interest of kings decreased, that of the public increased. It is recorded in 1825 that Kew was open to the public on Sundays from Midsummer

till Michaelmas, and, in 1838, Lindley reported that visitors were admitted unreservedly to the gardens daily except Sundays. It was about this time that public interest became so intensified by unfavorable criticisms on the condition of Kew by various scientific men, notable among these being Lindley, that the Treasury, in January, 1838, the year after William IV's death, appointed a committee "to enquire into the management, etc., of the Royal Gardens." This committee, consisting of Lindley, Mr. (afterwards Sir Joseph) Paxton, gardener to the Duke of Devonshire, and Mr. Wilson, gardener to Lord Surrey, reported in the following month. The report is of great interest, as it gives a detailed account of the configuration of the gardens and of the extent of their contents at that time.

Between the reporting of Lindley and the presentation of the report to Parliament, it became known that the Lord Steward, then Lord Surrey, who by virtue of his position had control of the Kew Gardens, had, after visiting the gardens, offered the plants in the houses to the Royal Horticultural Society at Chiswick and the Royal Botanic Society at Regent's Park, with the intention of converting the houses at Kew into vineries and pine stoves. Both of the gardens in question refused the offer, but it was, nevertheless, Lord Surrey's intention to put his vinery project into execution. The effect of this was to rouse public indignation, and Lord Surrey's project was accordingly abandoned, with the ultimate result that "the charge of the Botanical and all other gardens . . . . at Kew, except the Kitchen Gardens," was transferred to the Commissioners of Woods and Forests by a Treasury minute of March 11, 1840. W. T. Aiton resigned his directorship of the Botanic Gardens at the end of the same year, but retained that of the Pleasure Grounds until 1845. Sir William Hooker, F.R.S., who was Regius Professor of Botany in the University of Glasgow at the time of Aiton's resignation, was appointed Director of the Botanic Gardens and became duly installed on the 1st of April, 1841.

With Sir William Hooker's installation as Director of Kew, what we may call the rejuvenescence of the institution began, and Kew became a complete national establishment. After Aiton's relinquishment of the direction of the Pleasure Grounds, Sir William became director of the whole. The aims which Sir William Hooker kept in view were three in number, viz.:

(1) To make of Kew a pleasure ground which would stimulate

the interest of the general public in the vegetable kingdom and its products.

(2) To encourage and render assistance to scientific botanists, travelers, merchants and manufacturers.

(3) To train plant collectors and gardeners for home, Colonial and foreign service.

With the first of these we are only slightly concerned in the present paper, and only indirectly with the third, but the second is of the greatest interest, inasmuch as Kew has become the fountain-head of information on medicinal plants in this country.

The ramifications of each of these groups, however, have become so numerous, and the details of their varied developments so intricate, that it will be conducive to clearness at this stage to subdivide the matter under the following heads:

The extension of the gardens, with special reference to the collections growing out of doors.

The Plant Houses.

The Museums of Economic Botany, the Jodrell Laboratory and the Herbarium.

The Administration of Kew and its Work.

THE EXTENSION OF THE GARDENS.

The Botanic Garden, at the beginning of Sir William Hooker's directorate, was but fifteen acres in extent. The first extension of this area took place in 1843, when about forty-seven acres of the adjoining pleasure grounds were added to it for the formation of an arboretum, and were separated from the pleasure grounds by a wire fence. This addition was at the time considered to be of sufficient extent for the purpose, and preparations were made for carrying out the project, but when the pleasure grounds were placed under the charge of Sir William Hooker by the Commissioners of Woods and Forests, on July 9, 1845, he utilized these for the formation of an arboretum, and the forty-seven acres which had previously been fenced in were made use of for the development of the general collection. In his report to Parliament for 1853, Sir William states that since the pleasure grounds were placed under his charge they have "been laid out primarily as an arboretum for the cultivation of every tree and shrub which will stand the open air in this climate." The Nursery was formed in 1850.

In the Winter of 1846–47, fifteen more acres were incorporated with the Botanic Garden by the suppression of the Royal Forcing and Kitchen Gardens. To the land thus acquired the herbaceous and grass collections were transferred.

In 1851 thirteen acres were taken from the Deer Park (see map, Plate I) and added to the Queen's Cottage grounds, an enclosure on the southwestern corner of the pleasure grounds reserved for the private use of the Crown.

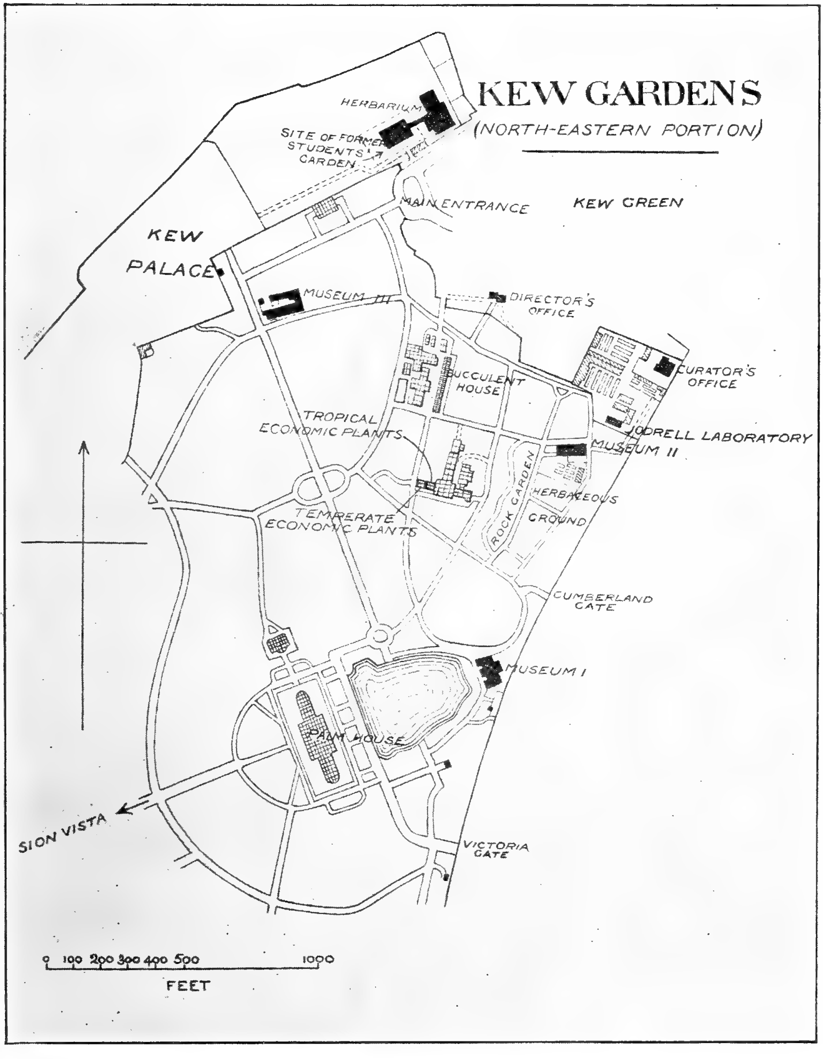
A further acquisition was made in 1853, when three acres of the piece of ground known as the paddock, and adjoining the former kitchen garden, were added to the northeastern portion of the Botanic Garden. In these a separate collection of British plants and one of hardy medicinal plants were set out.

In 1855 Dr. (now Sir) J. D. Hooker, son of Sir William Hooker, who was then 70 years of age, was appointed assistant director, and in 1865, on the death of his father, he succeeded to the directorship without an assistant. The arboretum begun by his predecessor was developed and in a great measure remodelled by him, and we have, so to speak, an index of its increasing importance from his annual reports; thus, we find in the report for 1871 that the heading "Pleasure Grounds" has been replaced by the "Pleasure Grounds and Arboretum." In the report for 1872 this has been further modified to the "Arboretum in the Pleasure Grounds," and in 1878 the transformation is complete, the former expressions having been entirely supplanted by the "Arboretum," which stands alone.

Soon after Dr. Hooker's appointment as director, the medicinal and British collections were done away with, and in 1869 the whole of the herbaceous collection was rearranged, new potting sheds, a seed room, frames, etc., being added to it.

A small students' garden, in which it was permitted to gather specimens, was subsequently made in 1880 on the site of the recently completed wing of the Herbarium building.

In 1875 Mr. (now Sir) William Turner Thiselton-Dyer was appointed assistant director, and, on the retirement of Sir J. D. Hooker, in 1885, became Director, a position which he still holds. Dr. (now Sir) D. Morris was appointed assistant director to Sir W. T. Thiselton-Dyer in 1886, but, since his subsequent appointment as Commissioner of Agriculture at Barbados in 1898, the post which he formerly occupied has remained unfilled.



PORTION OF KEW GARDENS KNOWN AS THE "BOTANIC GARDENS" PROPER.
NOTE.—*The plant houses are indicated by crossed lines, the other buildings by black areas.*

During the present director's period of office the principal changes that have taken place are the removal, in 1895, of the wire fence that used to separate the Botanic Gardens from the Arboretum,[1] and the surrender to the Kew authorities of the private grounds of the Crown, which were thrown open to the public on May 1, 1899. The public path traversing these, however, is railed off from the remainder of the grounds; this being done to avoid disturbing the wild birds that have taken refuge in that retreat. The students' garden has also been abolished, in order to make room for the Herbarium extension.

[*To be continued.*]

ALBERT HILGER.

By Virgil Coblentz.

Obermedizinal and Hofrat Prof. Dr. Albert Hilger, director of the Pharmaceutical Institute and Laboratory for Applied Chemistry in the University of Munich, died in consequence of an apoplectic stroke on May 18th. Born May 2, 1839, in Homburg, he began his apprenticeship as apothecary in his fifteenth year at Langenkandel, his assistantship being served at Carlsruhe, where he also took up the study of chemistry in 1857. It was not till 1861 that he took up his chemical work in earnest at Wuerzburg which he continued at Heidelberg, where he passed the State Pharmaceutical examinations and made his doctorate. During the years 1864-67, Hilger served as assistant to Professor Scherer in the Wuerzburger Chemical Laboratory. From '67 till '69 he conducted a private chemical laboratory as well as served as director of the Agricultural Laboratory of Lower Franconia. For two years ('71-'72) after the death of Professor Strecker, Hilger occupied the chair of Chemistry of the University of Wuerzburg, when he responded to the call of the University of Erlangen to fill the chair of Applied Chemistry and Pharmacy.[2] Here he remained until 1892, when he was

[1] The position which it occupied is shown by a dark line in the map on the smaller scale (Plate I). The map on the larger scale (Plate X) corresponds roughly to that portion of Kew Gardens known as the Botanic Gardens, although the latter title is now perfectly applicable to the whole of them.

[2] Pharmacy, in the European sense, is pharmaceutical chemistry, the manipulative art (practical pharmacy) is, to my knowledge, not taught at any of the pharmaceutical institutes.

selected as successor to Professor Buchner, of Munich. The Pharmaceutical Institute, like all others in Germany at that time, was conducted on a very modest scale, being inadequate to the needs. This condition was largely due to the antagonism of the chemical departments.[1] Through the untiring energy of Hilger, the new and elaborately equipped Institute was built on Karlstrasse, next to the Bayer laboratories, in 1896. The new building, which was but two stories high, covered a considerable area, a higher structure being objected to by the Catholic Basilica some distance below on the opposite side of the street. A better and more completely equipped laboratory for scientific research is scarcely to be found. As a teacher Professor Hilger's energies were devoted chiefly to the development of the practical side of the education of the German apothecary, and as a chemist and toxicologist, to advancing the interests, scientific and civic, of food chemistry. In this latter branch, Professor Hilger stands foremost among European chemists as the primary organizer of the Royal Laboratories for the examination of foodstuffs and beverages, which embraced the Universities of Wuerzburg, Munich and Erlangen. The chief aims of these commissions for controlling pure foods and beverages were more in an educational and advisory capacity to the producers than as public prosecutors. This form of organization for the inspection and control of foods has given the greatest satisfaction and thrived without opposition for over twenty-one years. Hilger was the organizer and president of the Free Association of German Food Chemists, where his influence and energy were directed towards systematizing and securing greater uniformity in the methods employed for the examination of foods and beverages. In conjunction with Professor Husemann he issued the valuable work entitled "Die Pflanzenstoffe;" further, he was the editor of the *Zeitschrift fuer Untersuchung*

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[1] It was considered sufficient if the pharmacy candidate heard the regular course of chemical lectures. In many of the larger German universities the lectures on general inorganic and organic chemistry are more especially directed to the wants of the medical students and are therefore of little interest to the chemist and do not by far take the place of a course in pharmaceutical chemistry. The writer, after having heard such courses for ten semesters in various German universities, fails to see any relationship between these lectures and medical or pharmaceutical chemistry as taught in the United States, or such as were delivered by Professors Flueckiger, Hilger, or at present by Professor Schmidt of Marburg.

der Nahrungs- und Genussmittel, as well as associate editor for the *Jahresberichte fuer Agrikulturchemie* and *Jahresberichte der Pharmacie*. Among the many honors conferred upon Professor Hilger were the Rectorate of the University of Erlangen, the titles of Koeniglicher Hofrat and Obermedizinalrat, Doctor *honoris causa* of the University of Bologna, the Bavarian Order of St. Michael, and the Prussian Order of the Red Eagle, as well as active and honorary memberships in many scientific societies. Professor Hilger's genial and democratic character endeared him to his students, assistants and colleagues. He was regular in his visits to his laboratories and untiring in his attention to all classes of students. His memory will ever remain dear in the hearts of all his students and friends.

CHAIRMAN'S ADDRESS BEFORE THE SECTION ON EDUCATION AND LEGISLATION.[1]

By Harry B. Mason.

In my address as Chairman of this Section at Kansas City last September the statement was hazarded that the association year then closing had ushered in what would prove to be a new era in the evolutionary development of the calling. It was pointed out that the movement for State legislation in pharmacy, entered upon thirty years before, and compelling druggists to undergo State board examinations before they could practise their calling, had been brought to its culmination during the year by the action of Congress in providing Indian Territory with a statute; that the next stage in the legislative process had been immediately approached by the enactment in New York State of a "prerequisite" law making graduation from a reputable college of pharmacy compulsory on the part of licensed proprietors; that this new movement would proceed slowly but nevertheless surely towards its completion as the previous one had done; and that from these and other phenomena it was evident that we were clearly and definitely entering upon an epoch of more severe educational standards in pharmacy, and an epoch consequently of greater commercial and professional betterment.

That this prediction was justified is abundantly apparent from the

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[1] Delivered at the Atlantic City Meeting of the American Pharmaceutical Association, held September 4 to 9, 1905.

developments of the year which has elapsed since we gathered in Kansas City last September. Of first importance are the acts of two other States in ranging themselves alongside New York in the vanguard of the new movement for compulsory graduation in pharmacy. The Pennsylvania pharmacists have secured an amendment to their pharmacy law providing that hereafter a candidate for the board of pharmacy examination who desires to become the proprietor of a store "must present satisfactory evidence of being a graduate of some reputable and properly chartered college of pharmacy." In Wisconsin, the Board of Pharmacy has boldly established the graduation requirement on its own initiative. It has passed resolutions providing that after July 1, 1905 (a date now passed), all candidates for examination must have had one year of high-school work or its equivalent; that after July 1, 1906, they must have had one year of at least thirty-two weeks in a school of pharmacy recognized by the Board; and that after July 1, 1907, they must have had a full pharmacy course. The Pennsylvania amendment affects the proprietor only, but the New York law and the Wisconsin resolutions make no distinction between proprietor and clerk.

If we do not forget Hawaii, which enacted the Beal model law of this Association two or three years ago, including even the graduation requirement contained in that measure, we see that four States and Territories now demand that the pharmacist of the future shall be properly trained for the responsible duties of his occupation in an accredited school or college of pharmacy. A fifth commonwealth, Minnesota, endeavored likewise to secure the enactment of a graduation prerequisite law this year, and the attempt would doubtless have succeeded had it not been for the strange and unaccountable opposition exerted at the eleventh hour by a group of pharmacists themselves—an occurrence which brings home to us most forcibly the truth that in this demand for better things we shall need to educate those *within* no less than those *without* our ranks to the cardinal importance and necessity of the step. In the meantime, however, it is most reassuring to observe that at least three State Associations, convening in annual session during recent months, have decided to secure graduation prerequisite legislation at the earliest practicable time—and the end is not yet!

But the educational progress of the last year has by no means

been limited to the impetus given the graduation prerequisite movement. Several boards of pharmacy, realizing that the time has come for advances all along the line, have increased their requirements with a clear-sighted courage which should win our support and admiration. The Ohio Board has led the way by resolving that hereafter no candidate shall be given "experience" credit for time spent in college unless that college insists upon one year of high-school work or its equivalent as an entrance requirement, and unless it exacts 80 per cent. of attendance upon two distinct college years of not less than twenty-six weeks each. The Indiana Board has passed resolutions of practically the same import, with the additional provision that "recognized" colleges must give work enough to render it impossible for the student to be employed in a store contemporaneously. The Arkansas Board has resolved that in the future all candidates for examination must have had a general education equivalent to that demanded as an entrance requirement by the graded high-schools of the State; and the Oklahoma Board, which registers candidates upon diplomas, has decided that only those colleges will be thus accredited which require a full high-school training or its equivalent as an entrance standard, and which have courses comprising two school years of not less than twenty weeks each. These four boards have rendered a distinct service by showing what can be done intelligently and fairly without waiting for the slow and snail-like progress of legislation; and every sincere friend of pharmacy now looks to the boards of other States to follow in the path which has been blazed by these pioneers.

One other educational advance of the season has yet to be recorded. The Michigan pharmacists, after years of agitation and trial, have secured the enactment of a law which, among many other excellent features, provides that all future candidates for the Board examination must have had a general education representing two years of high-school work.

What then, to recapitulate, has the last year registered in the way of educational progress? Pennsylvania and Wisconsin have established the graduation requirement, following in the footsteps of New York and Hawaii; Michigan has established a preliminary standard of two years of high-school work; Arkansas has established the grammar-school standard; Oklahoma has declared that it will hereafter register upon diploma only those graduates who come from

colleges requiring a full high-school course; and Ohio and Indiana have decided not to give "experience" credit to graduates unless they are from institutions which demand one year of high-school work, and which have courses conforming to certain prescribed curriculum standards. When we consider these several advances; when we realize that they are all along new lines of progress; when we recall that we have a "Conference of Pharmaceutical Faculties" which is now beginning to exert a standardizing influence; and when we remember that a "National Association of Boards of Pharmacy" was established at Kansas City last year, an association destined to be of signal service in this new era of higher educational requirements—when we consider these various phenomena we shall make no mistake by harboring in our breasts the keenest and most sanguine hope for the future.

Already the effects upon our educational system in pharmacy have begun to be apparent and salutary. Colleges have here and there elevated and strengthened their courses and increased their entrance requirements, while the work of discriminating between the schools, and putting the stamp of approval and recognition upon the better and the more efficient institutions, has been given a headway which must seem ominous to the colleges whose work falls below the standard. In New York State the four colleges of pharmacy have made their entrance requirements and their curriculum standards conform to the demands of the prerequisite law. In Ohio some if not all of the many pharmaceutical schools in the State have likewise effected the improvements made necessary by the resolutions of the Board of Pharmacy. And the New York, the Pennsylvania, and the Ohio Boards have all issued lists of colleges whose graduates, and whose graduates only, will be given recognition under the new order of things. There are over eighty schools of pharmacy in this country, and yet the New York list contains but sixteen of them, the Ohio list seventeen, and the Pennsylvania list the twenty-one colleges comprising the membership of the Conference of Pharmaceutical Faculties. Before other schools can secure place upon the rolls of honor, and make it possible for their graduates to obtain recognition in these three States, they must conform to the standards and come up to the scratch line.

There is, we must remember, still another agency operating to standardize our colleges of pharmacy and to separate the more

efficient from the less efficient institutions. I refer to the Conference of Pharmaceutical Faculties. After several years of discussion and preparation, this body formulated definite membership requirements last year. Hereafter it will be necessary for every college which desires admission into the Conference to have been in existence continuously for five years, to have a grammar school entrance standard, to require of each student for graduation not less than 500 hours of lecture and 600 hours of laboratory work, and to give a total course of instruction covering a period of at least forty weeks.

These membership requirements are not severe; many zealots think they are discouragingly low and unsatisfactory; but we must creep before we can walk, and we should realize that the only reform which ever proves permanent is that which reckons with human nature and human progress as they exist at the moment, and which goes neither so fast nor so far that it is denied hearty support and encouragement. The Conference has made a beginning—this is the important point. It has entered the wedge, and strong arms will not be lacking to drive it farther and farther home as the knots and the knarls gradually give way.

In the meantime let us realize that the membership standards of the Conference, while not so high as some of us in our zeal would have them, are yet severe enough to shut out many of the pharmaceutical schools of the country. Already, then, the Conference has begun the work of discrimination between institutions, and we have an inkling of how valuable this work will be when we recall, what has already been stated in this address, that the Pennsylvania Board of Pharmacy has accepted the list of twenty-one schools comprised in the membership of the Conference as the colleges whose graduates will be given recognition under the operation of the newly enacted prerequisite law of the State. That the standards of the Conference—those now established as well as those to be established in the future—will become here and there the standards of one State board and another, is certain; and thus the work of this body is seen to be pregnant with usefulness and possibility, and not to be merely deliberative and academic in character as it has necessarily been during the first few years of preparation.

Returning now to the subject of graduation prerequisite enactments, it is of course clear that the fundamental purpose of such legislation is to demand a greater degree of fitness from the prac-

titioner of pharmacy. But we have seen that incidentally these laws have had no less salutary an influence in elevating and standardizing the work of our colleges and schools, and particularly in forcing upon them better entrance requirements. This, indeed, is one of the most vital and important aspects of the prerequisite movement. In a debate before this section last year—one of the most able and important debates within the recent history of the association—several high-minded and earnest teachers protested that while higher entrance requirements should unquestionably be imposed, the good colleges had always been absolutely helpless to establish them. For the very instant they were to raise the bars the rejected students would pass on to the open and hospitable doors of the poorer schools, and thus the cause of educational pharmacy would be retarded instead of advanced. "Give us graduation prerequisite laws," said these teachers; "give us laws which will demand certain entrance standards of schools and which will deny recognition to the institutions failing to conform to these standards; protect us from cheap and unfair competition in this manner, and we shall then be glad to do what it would otherwise be suicidal for us to attempt."

Now in the light of this earnest and rational appeal it can only be regarded as unfortunate that the Pennsylvania prerequisite law establishes no entrance or curriculum standards of any sort or kind whatsoever. It may be argued in defence that the Board of Pharmacy has assumed an authority under the rather adroit language of the amendment[1] to discriminate between schools, and that it has acted wisely in deciding to recognize the twenty-one members of the Conference of Faculties. But no such authority and autocratic power should be vested in the Board of Pharmacy of any State. The boards themselves would be the last to desire it. It would enable one board to undo what another board had done. It would thus be fatal to permanence and stability of action. It would cause boards to be flooded with petitions and complaints from candidates and pharmacists who thought their requirements too severe. It would subject the whole disposal of standards to the dictates of graft and political influence. In many States it would result in a fight and scramble

[1] Every candidate "must present satisfactory evidence of being a graduate of some reputable and properly chartered college of pharmacy."

on the part of colleges with easy consciences to gain representation on the boards and to dispose of things in their own selfish interests.

Of the three States of the Union proper which now demand graduation in pharmacy, two of them, New York and Wisconsin, have established a preliminary requirement equivalent to one year of high-school work, and they have likewise established certain curriculum standards also. So far only Pennsylvania has ignored this vital necessity, and perhaps no particular harm will have been done if the same mistake is avoided with the several prerequisite laws which are quite sure to be enacted within the next few years. But I can only regard it as ominous that from certain quarters during the year has come the declaration that future prerequisite laws, unlike the New York amendment and the Wisconsin resolutions, should stop with making the college course compulsory, and should have nothing whatever to say about preliminary requirements. I believe this to be dangerous gospel and I think we cannot correct it any too soon or any too vigorously.

And what, forsooth, are the reasons advanced why we should establish no preliminary standards in our prerequisite legislation? There are only two of any consequence, and both are equally unsound. One is that it would not be fair to future candidates to keep them in the public schools a year or two longer, and the other is that if we increase the standard of general education we shall cause a stringency in the clerk market.

The first reason seems to me almost childish. We cannot abort the whole prerequisite movement out of sympathy for a few clerks who are anxious to get their certificates at the earliest possible moment regardless of competency. If we must coddle and nurse them along, why do them the cruel unkindness of asking them to go to the college of pharmacy, or even to pass through four years of "apprenticeship" at low wages? It is absurd! And yet, from this very viewpoint of sentiment and sympathy for the clerk, are we not after all doing him a great kindness instead of an injury by compelling him to undergo that degree of preparation for his calling which will vastly increase his chances for success and at the same time exempt him from a certain class of cheap competition?

The argument that an elevation of preliminary standards would lessen the supply of clerks seems to me equally specious. The stringency of the clerk market which has already been with us two or three

years, is due entirely to other causes, and is gradually being overcome by the increased salaries which a decreased supply of clerks has called forth in accordance with economic law. Prerequisite legislation has had and will have no effect upon the situation save a salutary one. For let me ask what class of boys, if any, will increased entrance requirements keep out of the calling? Only the stupid and the ill-prepared ones. But are these the ones who have been leaving the drug business during the last year or two? You couldn't drive such boys away with a club, for they have no chances elsewhere; but even if they had gone and did go we should cry "good riddance" after them. No, the young men whom we have been losing are the bright and the fairly well-prepared ones who have been disappointed with the conditions in pharmacy, and discouraged with the cheap and uneducated competition which they have had to face. These are the young men we want, and we can get them in no better or surer way than by improving the educational and professional character of the calling, and therefore both its dignity and its opportunities for financial success.

Among other cogent reasons, there are two in particular why we should insist upon the definite specification of suitable preliminary standards in all our graduation prerequisite laws. The first has already been mentioned in this address. I refer to the opportunity which the prerequisite movement presents of enabling the efficient and high-minded colleges to raise their entrance standards in a manner which the conditions of the past have practically rendered impossible. The one serious defect in our educational armor has been low standards of general education—not only *low* standards, but in the majority of instances almost no standards at all. Pharmaceutical education has made great strides during the last twenty-five years; college courses have been greatly extended, amplified and improved; but this progress, gratifying and necessary as it is, has been considerably nullified and defeated by this cancer which has so largely robbed the educational system of its strength.

You can't take a half-baked boy off the streets, with very little or no mental training, and teach him chemistry and botany and pharmacy and the rest. And yet this is the almost hopeless task which our colleges have been endeavoring to perform. The results? A Western Board of Pharmacy has found so many college graduates unable to do the simplest mathematical calculations which would be

required of them daily in the store; it has found so large a number of candidates deplorably lacking in the fundamental knowledge really more vital and important than pharmaceutical learning; it has discovered graduates to have profited so little by their pharmaceutical courses for these reasons, that it has established a preliminary examination in the general branches which a candidate must first pass before he can come up for the pharmaceutical examination. Think of it! We must permit the water to rush through great holes in the dam above and then try to prevent the inevitable flood below by sweeping the water back with a broom?

We have now the chance to correct this condition of things and stop up the leak from which we have always suffered. It would be little less than folly of the most stupid sort not to grasp the opportunity and make the most of it.

The second reason why it is of such cardinal importance that our prerequisite laws should impose definite preliminary and also curriculum standards is because these will prove a safeguard against the rising of a horde of mendacious and mushroom schools which prerequisite legislation will call into being. Medicine suffered this crippling penalty as soon, thirty or forty years ago, as she began to make graduation from college compulsory; and it has taken her nearly all of the intervening time to correct the mistake. The poorest and the most disreputable medical schools arose in great numbers in the leading cities of the country, and it was long before they were forced downwards out of existence or forced upwards into the paths of virtue. Why can't we profit by example? Must we burn our own fingers before we find the stove to be hot? An ounce of prevention is worth considerably more than a ton of cure—and it is applied a good deal more easily.

I am no extremist. I am no doctrinaire with head in the clouds. I am convinced of nothing more strongly than this, that we should neither go too fast nor too far in this new educational era upon which we are now entering, if we desire our progress to be sure and if we expect it to be permanent. But I certainly believe that we should insist upon at least one year of high-school work as an entrance requirement in every graduation prerequisite law that we enact, with the clear understanding that in the years to come this standard is to be advanced just so fast, and only so fast, as the conditions permit and make necessary. I: the Territory of Oklahoma

can this year take a stand for a full high-school course, it seems to me that one-fourth of that might be stood with equanimity by the States of the cultivated and aristocratic East! With a unanimity no less significant than satisfying, the standard of one year of high-school work has been adopted in the prerequisite law of New York, in the prerequisite resolutions of Wisconsin, and likewise in the resolutions, already referred to, of the Ohio and Indiana boards of pharmacy. This standard is low enough. We should be ashamed to ask for less if we desire our graduation prerequisite laws to be possessed of any efficiency at all.

It may be argued by some fearful souls that we cannot secure this much from the legislatures, but it stands to reason that any legislature which would grant a college course would not strain over the gnat of so low a standard of preliminary education as one year of high-school work. At any rate we should ask for it, and then submit to failure only when it becomes necessary to do so. If we attempt nothing we shall certainly gain nothing.

In addition to prescribing definite entrance and curriculum standards there is one other thing needed of prerequisite laws. The acts of the various States must so far as possible be uniform in character if the best results are to be attained. As the United States grows more and more homogeneous, and becomes every year in reality more and more a single commonwealth instead of an aggregation of forty-five separate and distinct ones, it is increasingly necessary that legislation be alike in the various States if the conditions are to be coped with successfully, and if unnecessary confusion and hardship are to be avoided. We are to discuss this morning a specimen prerequisite law which a special committee has been appointed to draft. Let us hope that the measure will prove eminently suitable for our purposes, as we have every reason to expect it will, and let us hope also that it will then be accepted as the standard by the various States in order that uniformity of legislation may be obtained.

In conclusion let me repeat that we have much reason to be proud and hopeful over what has been accomplished during the past year. It is clear that a new cycle of development has been entered upon, and it is equally clear that it promises much for the general betterment of the calling—as much, indeed, for financial and social and commercial betterment as for educational and professional improvement, for one set of results carries the other with it.

A MODEL PREREQUISITE LAW.

The following is a copy of the draught of a prerequisite law and accompanying resolution approved by the American Pharmaceutical Association, at Atlantic City, September, 1905:

REPORT OF THE COMMITTEE ON FORM OF LAW REQUIRING GRADUATION FROM A COLLEGE OF PHARMACY BEFORE REGISTRATION.

Under a republican form of government, the greatest danger that can come to any reform is to acquire legislative sanction before it has received the sanction of public opinion, upon which it must depend for its continuance and enforcement.

Human institutions, both legal and of custom and opinion, are not like buildings which can be torn away and restored *de novo*, and hence changes and reforms in either, to be permanent, must be made to fit into the pre-existing structure without greatly disturbing prevailing sentiment or routine.

That the nature of the pharmacist's employment is such that public safety demands that no one should be admitted thereto without preliminary training afforded by a reputable college of pharmacy there is perhaps no difference of opinion among those who have given the subject sufficient consideration. That the college course should be preceded by a general literary education at least equivalent to a first-class high-school course is likewise generally assented to. The only difference of opinion is as to the manner in which these reforms are to be brought about and the time when they shall take effect.

Instead of fixing a definite amount of preliminary literary training, the present draught leaves it to the pharmacy boards to adopt such a standard as may seem to them sufficient and feasible of enforcement.

That these boards will be as exacting in this respect as the circumstances of the case will warrant is fully demonstrated by current history. Given the power to enforce proper preliminary training, there is no doubt but that the boards will quite generally raise the standard to as high a point as seems to them expedient, and of this expediency the boards are in a better position to judge than any other authority.

These principles, as they are understood by the committee, have

been kept in mind in the preparation of the draught which is hereby respectfully submitted.

Be it enacted by the General Assembly of the State of that Section (of the act regulating the Practice of Pharmacy) be amended so as to read as follows:

SECTION I. In order to be licensed as a pharmacist within the meaning of this act an applicant shall be not less than twenty-one years of age, and shall have been licensed as an assistant pharmacist for not less than two years prior to his application for license as a pharmacist, and he shall present to the Board of Pharmacy satisfactory evidence that he is a graduate of an incorporated school or college of pharmacy or a department of pharmacy of a college or university which shall possess a satisfactory equipment for giving instruction in the art and science of pharmacy, and which shall enforce such requirements for admission and graduation as shall be satisfactory to the Board of Pharmacy, and that he has had four years' experience in pharmacy under the instruction of a licensed pharmacist; and he shall also pass a satisfactory examination by or under the direction of the Board of Pharmacy.

Provided, however, that the actual time of attendance at a college of pharmacy or department of pharmacy of a college or university approved by the Board of Pharmacy shall be deducted from the time of experience required, but in no case shall less than two years' experience be required for registration as a licensed pharmacist.

SEC. 2. That Sections (of the act regulating the Practice of Pharmacy) be and the same are hereby repealed.

SEC. 3. This act shall take effect and be in force from and after

RESOLUTION ADOPTED BY THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Resolved, That it is the sense of the Section on Education and Legislation that when graduation from a college of pharmacy is made a prerequisite to registration, boards of pharmacy should require from such colleges as are recognized as reputable the enforcement of a requirement for entrance to such colleges a preliminary general education which at least shall be the equivalent of the first year in a standard high-school, and that the board shall, as rapidly as conditions will permit, raise the requirement to that of graduation from a standard high-school.

PROGRESS IN PHARMACY.

A QUARTERLY REVIEW OF SOME OF THE LITERATURE RELATING TO PHARMACY.

By M. I. Wilbert,
Apothecary at the German Hospital, Philadelphia.

The recently issued Eighth Decennial Revision of the Pharmacopœia of the United States continues to be a favorite subject for discussion in the pharmaceutical, and also to a very marked degree in the medical, journals of this country. The book itself continues to be favorably spoken of and is generally accepted as being the most comprehensive as well as the most generally accurate of the pharmacopœias so far published. Various portions of the contents of the book, it is true, are being rather freely discussed and criticised, but as the criticisms that have so far appeared are almost entirely of details of descriptions and tests, they do not in any way reflect on the general excellence and reliability of the book, nor will they in any way interfere with the accepted adaptability of the book to the practice of pharmacy as it is carried on in the United States at the present time.

Spanish Edition of the U.S.P.—The desirability of a Spanish edition of the present official U.S.P. has been repeatedly suggested, and the various uses and the needs for such an edition have been referred to on various occasions. That such an edition would be of inestimable value from an educational point of view is generally conceded, but the advisability of the undertaking as a business venture has been seriously questioned. A resolution adopted at the meeting of the International Sanitary Conference of the Pan-American Republics, held in Washington, October 12, 1905, may possibly suggest a way for securing the necessary funds by appealing to the now existing Bureau of Pan-American Republics with the ultimate object of providing an International Pan-American Pharmacopœia.

Spanish Pharmacopœia.—The seventh edition of the official Spanish Pharmacopœia was announced as having been published, by the permanent Revision Committee of the Royal Academy, under date of June 20, 1905. Under date of June 21, 1905, the president of the Royal Academy announces that the book has met with the approval of H. M. the King, and "that the said edition of the Spanish Pharmacopœia be henceforth official for the practice of medicine and pharmacy throughout the Kingdom, and that its posses-

sion be obligatory to every pharmacist." The permanent revision committee of the Royal Academy is composed of medical as well as pharmaceutical members, and this latest edition of the official Pharmacopœia is said to be far in advance of the previous book. (*Brit. and Col. Drug.*, August 25, 1905.)

Swiss Pharmacopœia.—The Commission having the revision of the present Pharmacopœia of Switzerland in charge has made it a practice to publish, from time to time, bulletins announcing the progress that is being made and the more important changes that are proposed or accepted. The latest of these bulletins (*Schweiz. Woch. Schr. f. Chem. u. Phar.*, 1905, page 531) announces the proposed strengths of a number of galenical preparations, by assay. Extract of belladonna is to contain no less than 1·5 per cent. of alkaloids when assayed according to the method adopted for international standards. The recently published U.S.P. requires that extract of belladonna contain 1·4 per cent. of mydriatic alkaloids.

The fluid extract of coca is to contain 0·7 per cent. of alkaloid; the U.S.P. directs 0.5 per cent.

Fluid extract of hydrastis of the Swiss Pharmacopœia is to contain the same amount of alkaloid prescribed by the recently issued U.S.P.—2 per cent. The Swiss fluid extract of ipecacuanha is to contain 2 per cent. of alkaloids, while our own fluid extract of ipecac is required to contain 1.65 per cent.

Nostrums and Patent Medicines.—Never before has the nostrum traffic attracted the attention that is being given it at the present time, both in medical and lay journals. The work that is being done by the Council on Pharmacy and Chemistry of the American Medical Association has been commended by medical men and medical societies in all parts of this country and has also attracted considerable attention abroad, particularly in Great Britain, where the use of semi-secret or proprietary remedies by physicians has been increasing. While the work that has been outlined for the Council on Pharmacy and Chemistry may be said to have just been begun, it is pleasing to note that the use and sale of a number of the more objectionable "ethical" nostrums have been materially reduced.

Much of the credit for this professional reawakening is no doubt due to the articles that have been published in lay journals, descriptive of the methods employed by manufacturers of so-called patent medicines to advertise and sell their goods.

Even the most casual observer must note the similarity between the methods adopted by the manufacturer of patent medicines to muzzle the average daily paper and the methods that are so effectively adopted by the manufacturers of proprietary remedies to subdue and to effectually control the medical journals of this as well as other countries. After all, who is there that can point out any real difference between the "ethical" nostrum and the popular nostrum? Any difference that is at all evident is one of degree rather than principle.

Druggists as Retail Liquor Dealers.—John W. Yerkes, U. S. Commissioner of Internal Revenue, has recently ruled that on and after December 1, 1905, manufacturers of compounds containing distilled spirits, and in which the presence of medicinal drugs is not readily discoverable by chemical analysis, will be obliged to take out a rectifier's license, and that all dealers who handle these compounds will be required to pay the regular fee and consequently to register as retail liquor dealers. Apart from this there will no doubt be a further complication for the retail dealer in States having high-license laws and in States where local option or total prohibition prevails. Even at the present time the Excise Commissioner of New York State has several suits pending to recover the payment of the State liquor license for the sale of widely used patent medicines containing a large amount of distilled spirit.

N. A. R. D. Meeting.—The seventh annual meeting of the National Association of Retail Druggists was held in Boston, Mass., September 18 to 22, 1905. This meeting is said to have been the largest and most enthusiastic assemblage of retail druggists ever held in this country. In addition to the usual routine business, dealing largely with the trade relations existing between the retailer, the wholesaler and the manufacturer, the association appears to have devoted an unusual amount of attention to the discussion of more or less strictly pharmaceutical subjects. Among other highly commendable principles, the association adopted a resolution heartily endorsing the work that has been undertaken by the American Medical Association to eliminate secret, fraudulent and fake remedies, and further provided for the appointment of a Council on Pharmacy and Chemistry of the N.A.R.D. to assist the Council of the American Medical Association in the proposed work. A second resolution, also unanimously adopted, authorizes the Executive Committee of the association to create and to maintain a Committee

on Medical Detail to provide and distribute literature pertaining to U.S.P. and N.F. preparations among the members of the medical profession. The line of work outlined in the second resolution, if properly instituted and conscientiously carried out, would be not alone commendable but should prove of inestimable value to the members of the medical and pharmaceutical professions and would also be of direct benefit to that greater and infinitely more important class, the individual members of the community whose health and welfare are so largely dependent on the knowledge, honesty of purpose and efficiency of medical men.

American Pharmacologic Society.—On October 21, 1905, there was born at the Hotel Astor, in New York City, a society that has for its object the protection and advancement of the science of materia medica and the study and protection of proprietary and non-proprietary materia medica products, the manufacturers of which are willing to co-operate with the society by standardizing and maintaining the standards of their brands. The scope of the association is to be a very broad one, and it is proposed to include in its membership physicians, pharmacists, manufacturers and others who may be interested in the study and advancement of the science of pharmacology. The term pharmacology in this connection is defined to include pharmacy, pharmacodynamics, pharmacognosis and drug therapeutics. Dr. Wilcox was chosen as the first president, and Dr. Stewart was chosen as secretary of the society. (*Drug. Circ.*, November, 1905, page 409.)

The Liege Congress.—The International Congress of Chemisty and Pharmacy at Liege, Belgium, July 26 to 29, 1905, appears to have attracted comparatively little attention outside of Belgium. According to the *Chemist and Druggist* (August, 1905, page 253) the solitary congressist of English or American origin was Dr. F. B. Power, of London. The University of Liege was the meeting place, and the work itself was divided among nine separate sections.

The Seventy-seventh Annual Meeting of the German Naturalists and Physicians was held in Meran from the 24th to the 28th of September, 1905. As usual, the meeting was well attended, and the several sections had presented to them a large number of interesting and valuable communications, of which a fair proportion, relating more directly to pharmacy, were read at the meetings of the section on pharmacy and pharmacognosy.

Trade-marks and Patents.—Gnomon (*Phar. Jour.*, September,

1905, page 442), in commenting on the subject of "Trade Names in the U S P.," refers to a recently established practice, on the part of patentees of medicinal chemicals, that should deserve the attention of American pharmacists and medical men. He says that in order to overcome, if possible, the present practice of relinquishing the trade names with the expiration of the patent rights it has become customary for inventors to register trade-marks before taking out letters-patent for methods of producing articles which are afterwards sold under the trade-mark brands, the object being, of course, to secure the continuance of trade-mark rights after the expiration of the letters-patent. As this is only another way of arriving at the same goal, it remains to be seen whether greedy inventors will be permitted, in such cases, to attach a string to an invention as a trade-mark, to pull it back with after the patent expires.

Two New Aconitines.—Two new aconitines have been isolated at the Imperial Institute, from two new varieties of Indian aconite. One, which has been named Indaconitine, was found in the roots of the Indian aconite, called by Bruhl *Aconitum Napellus* var. *hiaus.* The other alkaloid has been named "Bikhaconitine," being derived from one of the highly poisonous forms of aconite known in India under the vernacular name of "Bikh." This aconite was named by Bruhl *Aconitum ferox* var. *spicatum.*

The pharmacological experiments show that the toxicity of Indaconitine is less than that of Bikhaconitine towards warm-blooded animals; in this respect the former stands very near to the aconitine of Aconitum napellus, whilst the latter being somewhat stronger than Japaconitine, is to be referred to a position between this alkaloid and pseudaconitine, from forms of *Aconitum ferox*, which is much the most active of the series. (*Chem. and Drug.*, September, 1905, page 278.)

Manipulated Opium.—"Opium Manipulé" is the basis of an interesting report published in a recent number of the *Journal de Pharmacie et de Chimie* (1905, page 529). Five samples were examined, all of which were guaranteed to contain 10 per cent. of morphine. Subsequent investigation demonstrated that while the samples did contain the required amount of morphine, they had been manipulated otherwise. All of the samples indicated that they had been manufactured by mixing extracted opium with morphine, thus suggesting that too much reliance should not be placed on an alkaloidal assay for morphine alone.

Alypin.—A new local anæsthetic, is the hydrochloride of tetra methyl diamino ethyl dimethyl benzoyl carbinol. Alypin is a crystalline, nonhygroscopic substance, melting at 169° C., and is readily soluble in water. Solutions of alypin are neutral and concentrated solutions may be kept for a long time.

Alypin is said to be a powerful local anæsthetic and to be readily absorbed by the mucous membrane. It is used in from 4 to 5 per cent. solutions, the anæsthesia lasting from eight to ten minutes. (*Apoth. Zeitg.*, 1905, page 586.)

Clavin, an active ingredient of ergot, is said to have a specific action on the uterus and to be quite innocuous otherwise. It is soluble in water, but insoluble in absolute alcohol. It is said to be quite stable. Aqueous solutions, however, decompose on standing. (*Phar. Zeit.*, 1905, page 687.)

Iothion.—Di- iodohydroxypropane is an ester of hydriodic acid designed for external use, in cases where the internal administration of iodine or of iodine compounds would be inapplicable. (*Brit. and Col. Drug.*, Aug., 1905, page 142.)

Novocain, a newly discovered local anæsthetic, is said to be the monochlorhydrate of P. amino benzoyl diethyl amino æthenol. Novocain occurs in acicular crystals that are readily soluble in water and also soluble in about 30 parts of alcohol. From its solution in water the free base may be precipitated by alkaline hydrates or carbonates. The aqueous solutions of novocain may be sterilized by boiling and are used subcutaneously in from 1 to 2 per cent. strength. (*Phar. Zeit.*, 1905, page 899.)

Solurol.—This is the trade name for a preparation purporting to be *Thyminic acid*, a nuclein derivative which has the property of holding uric acid in solution and preventing its precipitation. Solurol is a brownish-yellow, slightly deliquescent, amorphous powder, freely soluble in cold water, faintly acid in reaction and almost tasteless. Solurol may be given internally as a powder, in solution or in the form of compressed tablets. It has been given in doses of from 0·2 to 0·5 gramme, and is said to be free from any accompanying toxic or untoward symptoms. (*Phar. Jour.*, July, 1905, page 94.)

Sanoform, methyl di- iodo salicylate, a perfectly odorless white powder, is offered as a substitute for iodoform. The melting point of sanoform is 110·5° C., it can therefore be sterilized at 100° C. without decomposing. (*Phar. Jour.*, Sept., 1905, page 449.)

PHARMACEUTICAL MEETING.

The regular monthly pharmaceutical meeting of the Philadelphia College of Pharmacy was held on Tuesday afternoon, November 21st, with Joseph Crawford, a well-known Philadelphia druggist and botanist, in the chair.

Dr. M. Clayton Thrush, instructor in pharmacology and therapeutics at the Medico-Chirurgical College, Philadelphia, presented a paper entitled "The Eighth Decennial U. S. Pharmacopœia from the Physician's Standpoint," in which he commented on the various classes of medicaments now official. In conclusion he remarked that pharmacists should familiarize themselves with the work, make the new preparations and distribute samples of them to physicians, as also lists of the important changes for ready reference. The speaker considered it important to give instruction bearing on the Pharmacopœia to medical students, for he believed the older physicians would be more or less slow to take up with it, and that thus the younger practitioners would be the ones to use it. He said that much could be done to popularize the Pharmacopœia, and that the efforts of druggists in this direction would help to do away with the prescribing of proprietary preparations.

C. P. Gabell, a manufacturing pharmacist of Philadelphia, read a paper on "The Protection that Should be Afforded the Pharmacist by the Law," in which he argued that all poisons or substances containing poisons should be supplied to the laity only by druggists. He pointed out the inconsistency of druggists having to register poison sales when other classes of dealers, who are unqualified, are permitted to sell them indiscriminately and without restriction.

An interesting discussion followed the reading of these two papers. Dr. C. B. Lowe considered the majority of the criticisms made by Dr. Thrush to be just, and said that he has adopted the practice of dispensing the preparations of the new Pharmacopœia unless those of the previous edition are specified.

The subject of the official wines having been referred to, Warren H. Poley stated that the use of wine of coca was much abused, which is also the case with vin mariani, and he regretted that the law did not also apply to the latter.

In commenting on that portion of Mr. Gabell's paper relating to the qualifications required of druggists, M. I. Wilbert referred

to the manufacturing houses, and said that in many of these only one or two registered pharmacists are employed, while perhaps 100 or more unlicensed persons are employed. As to the sale of poisons, he said he was not altogether in favor of druggists having absolute control in the matter, and cited the sale of spirituous liquors as a business in which druggists would not care to engage. He thought that instead of making an effort to raise prices, an effort should be made to limit the number of druggists. Mr. Gabell said that spirituous liquors would hardly come under the head of poisons, and that this question, as also the one of reducing the number of druggists, would come under the head of special legislation. Mr. Poley said that it was not the aim of druggists to raise prices but to restore prices.

Dr. Thrush then considered the various remarks that had been made in connection with his paper. He reiterated the contention made in his paper that physiological tests should have been introduced into the Pharmacopœia, in reply to Mr. Wilbert, who stated that in his opinion the Committee of Revision had gone to extremes on the question of drug assays, and showed their inadequacy in certain respects, as, for instance, in the case of opium, which according to the assay method might contain the required percentage of morphine but be deficient in other constituents of opium, or even a juggled product containing simply the required amount of morphine.

Mr. Wilbert followed with a paper relating to recent advances in pharmacy. (See page 583.)

Mr. Poley desired to know if certain proprietary medicines the formulæ for which had recently been published would now come under the class of ethical preparations, and whether they would now be prescribed. Mr. Wilbert said that the proprietors of these medicines now belong to the class of ethical manufacturers.

J. T. Harbold expressed the view that the proprietaries are truly the preparations which should be stamped out, as they are being forced upon the people by being prescribed.

FLORENCE YAPLE,
Secretary pro tem.

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[1] Compiled by Florence Yaple.

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